SCREENING SITE INSPECTION

of

BULL OIL AND CHEMICAL TRANSPORTERS, INC.

(TXD982488741)

Prepared By

Jairo Guevara, FIT Chemical Engineer

Ecology and Environment, Inc.
Region VI

October 3, 1990

PRELIMINARY REPORT
This does not constitute final opinion of EPA

Reviewed by SHEB
Date _____

ecology and environment, inc.
1509 MAIN STREET, DALLAS, TEXAS 75201, TEL. 214-742-6601
International Specialists in the Environment

recycled paper

PREFACE

This Screening Site Inspection Report was prepared by Ecology and Environment, Inc. for the Environmental Protection Agency under Contract Number 68-01-7347.

SCREENING SITE INSPECTION

of

BULK OIL AND CHEMICAL TRANSPORTERS, INC.

TABLE OF CONTENTS

FIGURES

TABLES

1. INTRODUCTION

The Ecology and Environment, Inc. (E & E) Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA) under Technical Directive Document (TDD) F06-9003-11 to conduct the Screening Site Inspection (SSI) of the Bull Oil and Chemical Transporters, Inc. (TXD052488741) in Spring, Harris County, Texas.

1.1 SCREENING SITE INSPECTION OBJECTIVES

The SSI evaluates the potential risks associated with hazardous waste generation, storage and disposal at the site. It expands upon data collected during the Preliminary Assessment (PA) and identifies data gaps. Information obtained during the SSI supports the management decision of whether the site proceeds to the Listing Site Inspection (LSI) or receives the classification of No Further Action under the Superfund Amendments and Reauthorization Act (SARA).

1.2 SITE DESCRIPTION

Bull Chemical is an inactive chemical facility. It bought a wide assortment, in bulk or drums, of off-spec products (still bottoms, spent ethylene glycols, fatty alcohols, solvents, bases, acids), contaminated products and manufacturers overstock from chemical companies such as Olin Corporation, ARCO and Exxon. The products were stored on-site, repacked in drums and sold to private parties and third world countries (Ref. 1; Ref. 2; Ref. 3).

The site (Figures 1 and 2) (Ref. 17) is located at 28538 North East Hardy Street (approximately 1.3 miles north of Highway 2920, or Spring Cypress Road), in Spring, Harris County, Texas. The geographic coordinates are 30°06'13" north latitude and 95°25'22" west longitude. The site encompasses approximately one acre and is located in a 10 acre lot owned until 1988 by the site operator, Mr. Charles Duesing. Mr. Duesing died in 1988 and his widow took over the responsibility of the site (Ref. 1).

The facility is located at the end of East Hardy Street (which has very light traffic) in a rural, sparsely populated area. A bridge is under construction on East Hardy Street, over the North Gate Crossing Development Flood Control Creek north of the site. The completion of the bridge and improvements to East Hardy Street north of the creek may increase traffic at the site. When the site was in operation (1981 to 1988), it was fenced only at the south and west sides. A locked gate facing East Hardy Street was used to control access to the site (Ref. 1).

Bull Oil previously operated at Tomball, Texas (Sycamore and East Main Street). Several citizens complaints of foul odors and poor operation were investigated by the Harris County Pollution Control Department (HCPCD). The City of Tomball ordered Mr. Duesing to remove all debris, trash, barrels and tank trailers from the site. Mr. Duesing responded by moving his business to Spring in 1981 (Ref. 1; Ref. 4).

1.3 SUMMARY OF PRELIMINARY ASSESSMENT

The site's location in Spring has been the subject of investigations by the HCPCD, EPA, Texas Water Commission (TWC) and Texas Air Control Board (TACB). In 1988, the HCPCD requested EPA Emergency Response Branch (ERB) assistance to assess the imminent hazards. The main problems were spills and careless operation. The Technical Assistance Team (TAT) conducted a Site Assessment in June 1988. The ERB decided to remove the wastes (bulk tanks and drums) from the site based on the assessment and on a later midnight dumping incident at the site's main gate. The removal, with the exception of two drums, was completed in February 1990. During this investigation, a fence was installed on the north and east sides of the site. The site's main gate is locked (Ref. 1; Ref. 2; Ref. 15) (Photographs 1 through 8).

The TAT sampled the site in August 1988 and in January-February 1990. During the August 1988 off-site sampling inspection, before the waste sources were removed, three water, eight soil/sediment and seven air samples were collected. The water and soil/sediment samples were collected from drainage paths. Air sampling was conducted at the periphery of the site. The water and soil/sediment samples were analyzed for inorganics (metals) and organics (volatiles - VOAs, Acid/Base/Neutral - ABNs and pesticides/PCBs). Hardness, alkalinity and cyanides were also analyzed in the water samples. Cyanides, reactivity and EP toxicity were analyzed in the soil/sediment samples. The air samples were analyzed for acrylonitrile; benzene; chloroform; carbon tetrachloride; 1,2-dichloroethane and 1,2-dichloropropane.

The inorganics detected in the water and soil/sediment samples were calcium, chromium, copper, barium, iron, lead, maganese, mercury, nickel, potassium, vanadium and zinc. They were detected at concentrations 1.25 to 6.75 times greater than the background samples. Background levels of chromium and lead were high. The highest inorganic concentrations were detected at the low ponded area (Ref. 1).

The organics detected in the water and soil/sediment samples were 1,1,1-trichloroethane; trichloroethene; acetone; and unknown hydrocarbons. The organic compounds were found in the low ponded area. The concentration of the first two compounds was very high (1,060 and 3,710 ppm, respectively). No compounds were detected in the air samples above the detection limits of the method used (Ref. 1). During a previous TAT air survey with an OVA, readings of 3 ppm were obtained. An exception to this was a reading of 20 to 30 ppm measured in the breathing zone next to an area where styrene drums were stored.

In January 1990, a soil gas survey on-site and off-site was conducted with a Photovac unit. The survey indicated that the most contaminated area was the off-site pond at the northeast corner of the site (Ref. 5).

An extensive TAT on-site and off-site perimeter sampling took place in February 1990. The inorganics detected in this sampling were aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium and zinc. The

organics detected were chloroform; carbon tetrachloride; 1,2-dichloropropane, trichloroethane; tetrachloroethane; trans-1,2-dichloroethane; methylene chloride; cis and trans-1,3-dichloropropene; trichloroethene; benzene; tetrachloroethene; toluene; ethylbenzene; xylenes; styrene; chlorobenzene; tetrahydrofuran; phenol; isophorone; benzyl alcohol; benzo(b,k)fluoranthene; butylbenzylphthalate and unknown semi-volatiles (Ref. 16). The locations of the samples will be shown in a soon to be released TAT report, which will detail site characterization (Ref. 19).

2. DATA COLLECTION

The on-site reconnaissance inspection, sampling inspection and non-sampling data are addressed in this section.

2.1 ON-SITE RECONNAISSANCE INSPECTION

On April 10-11, 1990, the FIT (Team Leader Jairo Guevara and Site Safety Officer Thea Slone) conducted a reconnaissance inspection on-site and off-site. The waste sources (17 or 18 bulk tanks and approximately 1,000 drums), with the exception of two drums, were removed from the site by the Potentially Responsible Parties (PRPs) under request of the ERB. The two drums were scheduled to be removed as soon as negotiations with the PRP were completed. At the time of the inspection, the TAT was proceeding with the site assessment investigation. Areas on-site and at and near the north drainage creek were being evaluated. Three monitoring wells on the north and east sides of the site were installed by the TAT. Further characterization on-site and off-site, including sampling of the monitoring wells, was scheduled by the TAT after the FIT reconnaissance inspection was completed (Figure 3) (Ref. 5; Ref. 7).

Due to the ongoing ERB remedial investigation, the main SSI objective of the FIT reconnaissance inspection was sampling of the site area residential wells. A well survey of private and public wells was conducted by the FIT through interviews with local public officials and area residents (Figure 4) (Ref. 8; Ref. 9; Ref. 10; Ref. 11; Ref. 12).

The following documents were collected before and during the reconnaissance inspection:

- Site Assessment Report of October 20, 1988, prepared by TAT
- Site Assessment Report of November 17, 1981, prepared by FIT
- Memorandum of December 19, 1980, from City of Tomball Administrator to site owner
- Report: Development of Ground Water in the Houston District, January 1973
- Draft Sketch of TAT Soil-Gas Sampling, January-February 1990

2.2 SAMPLING INSPECTION

The FIT (Jairo Guevara and Marcus Finzel) sampled three residential wells near the site on July 11, 1990, following EPA approval of the Work Plan (Photographs 1, 2, 3 and 4) (Ref. 13; Ref. 15). Ed Sierra, Region VI RPO, accompanied the FIT during the sampling. Well owners were briefly interviewed during the inspection.

Only the residential wells (part of the ground water route) were sampled by the FIT (Table 1) (Photographs 1, 2, 3 and 4) (Appendix B). The following three residential wells (the most shallow wells near the site) were sampled (Figure 1):

1) Julian Davis well, the closest well to the site (1,000 feet), 140 feet deep (Ref. 10)

2) YMCA Pine Tree Camp, 150 feet deep, located approximately 1.2 miles southeast of the site, in the direction of a residential area (Ref. 11)

3) Jim Terry's well, 210 feet deep, located 1/2 mile north of the site in a residential area (Ref. 12).

The rationale for sampling the wells was to determine contamination. The wells were selected because they were closest and most shallow to the site.

The grab samples were collected from the nearest faucet to the well. The wells were purged for three to five minutes before the samples were collected directly in the sampling jars sent to the laboratory. Sampling, packing and shipping procedures were followed according to the FIT Quality Assurance Project Plan (QAPP). A matrix/spike, matrix spike duplicate, field collocated duplicate, trip blank and equipment rinsate were collected according to the provisions of the QAPP (Ref. 14).

3. ANALYTICAL RESULTS

The samples were analyzed for Acid/Base/Neutral Extractable (ABNs), organics-volatiles (VOAs), and chlorinated pesticides/PCBs, and for inorganics-metals and cyanides, under the Routine Analytical Services (RAS). The samples were also analyzed for hardness and alkalinity. Measurements of pH and conductivity were recorded in the field.

Five water samples were analyzed. Four were from three residential wells. One residential well sample was duplicated. The fifth sample was a field (trip) blank collected with deionized water provided by the E & F office in Houston. No organic contamination was detected in the four residential well samples. Only traces of some common metals in water, such as barium, calcium, iron, magnesium, sodium and zinc, were detected. Copper at a very low concentration was detected in one of the wells. The field blank sample analyses revealed the presence of small concentrations of phthalates, benzyl alcohol and benzothiazole. Most of

the contaminants are laboratory contaminants. Their presence could be due to field cross-contamination, such as storage, containers, etc. (Ref. 18).

4. SOURCE WASTE CHARACTERISTICS, PATHWAYS AND TARGETS

Source waste characteristics and the ground water, surface water, soil exposure and air pathways are addressed in this section.

4.1 SOURCE WASTE CHARACTERISTICS

The site's principal waste sources (removed by the TAT) were approximately 1,000 drums containing various chemicals, and 17 or 18 bulk storage tanks. A low area at the northeast corner of the site (currently outside the site fenced area) is the major existing waste source (Figure 3). The TAT pumped water from this low area during the site assessment. Some of the compounds detected both on-site and off-site were chloroform; 1,1,1-trichloroethane; trichloroethene; carbon tetrachloride; xylenes; 1,2-dichloropropane; tetrachloroethene; 1,2-dichloroethane; methylene chloride, hydrofuran; phenol; isophorone; 1,4-dichlorophenol; styrene; benzo(b,k)fluoranthene; ethylbenzene; butyl benzylphthalate and unknown organics (Ref. 6; Ref. 16).

4.2 GROUND WATER PATHWAY

The Chicot Aquifer supplies ground water for the site area. It is composed of clay and sand beds that are not persistent in lithology or thickness. The ground water direction at the site area is apparently northeast toward Spring Creek. There is no immediate population northeast of the site (west of Spring Creek). The area drinking water is supplied by public and private ground water wells (Ref. 5; Ref. 6; Ref. 7).

The Bayer Lumber Company is the largest public water supplier for the City of Spring. Bayer provides water to the town from two wells. One well is 195 feet deep (screen depth unknown) and the second is 538 feet deep (first screens located between 290 and 310 feet). The wells are located 1.5 miles south of the site and serve 284 homes. A well owned by Mr. William K. Bates and operated by A-1 Utility Construction Services, Inc. (Conroe, Texas) supplies water to 15 homes. This 390 foot deep well is located 3/4 miles south of the site. A third community well, approximately 2.3 miles south of the site, supplies water to the Lexington Woods Subdivision (Figure 4) (Ref. 8; Ref. 9).

There are several public water supply companies north of the site in Montgomery County. Consumer Water Corporation of Conroe distributes water to Spring Forest, approximately one mile northeast of the site. The Imperial Oaks residential subdivision, approximately 1.5 miles north of the site, and the Fox Run residential subdivision, approximately 1.3 miles northeast of the site, also receive public supply water (Figure 4) (Ref. 8).

Areas which are not supplied by public water systems have 140 to 300 foot deep individual private wells. The closest (Julian Davis) well

(140 feet deep) is 0.2 miles south of the site and provides drinking water for two homes. Three additional private wells are located south of the site on East Hardy Street. Private wells are also located on Riley Fuzzell Road. The closest (YMCA Pine Tree Camp) private well (150 feet deep) to the site on Riley Fuzzell Road is approximately 1.2 miles south. It is chlorinated with sodium hypochlorite. A second well (150 feet deep), just east of the first, will replace the well chlorinated with sodium hypochlorite as a source of drinking water in the near future. Two additional private wells are located on Riley Fuzzell Road, west of Spring Creek. Homes east of Spring Creek on Riley Fuzzell Road are also supplied by private water wells. The Spring Hill area, Sections 1, 2 and 3 north of the site, across Spring Creek and in Montgomery County, use drinking water from private water wells. The closest well to the site in this area is approximately 0.5 miles. Residences located on Interstate 45, between Spring Stuebner Road and Spring Creek, also receive water supply from private wells (Figure 4) (Ref. 7; Ref. 8; Ref. 10; Ref. 11; Ref. 12).

Three unsecured monitoring wells, 15 to 18 feet deep, located in the north and east sides of the site, were installed by the TAT in February 1990 and sampled by the TAT in May or June 1990. The samples were analyzed for volatile organics. The analytical results are listed in Table 2. 1,2-Dichloroethane; chloroform; trichloroethene and tetrachloroethene were detected. The highest concentrations were found in MW-3, located on the southeast corner of the site. The water table at the site was 13 feet from the ground level (Figure 3).

During the TAT investigation, subsurface soil contamination was detected at a seven foot depth, from which the deepest samples were collected (Ref. 19).

4.3 SURFACE WATER PATHWAY

The drainage from the site travels north into a small drainage ditch (100 feet north of the site), and is then piped into a creek (200 feet north of the site) which is part of the North Gate Crossing Development Flood Control. The creek discharges into Spring Creek (0.2 miles east), a tributary of the San Jacinto River which forms Lake Houston, a major surface water supply for Houston and nearby communities. Lake Houston is located 23 miles downstream from the site. The target downstream water (15 miles) is in Spring Creek, which receives Cypress Creek water 12 miles from the site.

To retain liquid which drained from the site, the site owner built a dike in the north and east sides of a low area in the northeast corner. Ponded liquid was present at this location until it was pumped out by the TAT. A natural drop of elevation occurs between the pond and the small drainage north of the site. The natural levees are eroded in several locations where drainage has flowed (Figure 3) (Photographs 9, 10 and 13) (Ref. 5; Ref. 15; Ref. 17).

4.4 SOIL EXPOSURE PATHWAY

The soil at the site appears to be contaminated with oily black and green stains (Photographs 1 through 8)(Ref. 5). The TAT completed the site characterization (on-site and off-site sampling, including samples from the flood control creek) in August 1990 and is planning to remove the contaminated on-site and off-site soil and replace it with clean soil. The most contaminated soil appears to be at the low ponded area. The TAT evacuated the liquid from this area and is planning to remove the contaminated soil and fill the low area with clean soil (Ref. 1; Ref. 5; Ref. 19).

4.5 AIR PATHWAY

The TAT recorded readings from the HNu of 30 ppm when the wastes were present on-site. An off-site air sampling inspection was conducted by the TAT prior to the containerized waste removal. No volatile emissions were detected during the sampling (Ref. 1).

No particulates were generated during the site operation because the wastes handled were liquids. Dust is not believed to be dispersed from the site, which has numerous concrete slabs. During the FIT reconnaissance inspection, readings were not detected with an HNu (Figure 3) (Ref. 5; Ref. 7).

5. PROJECT MANAGEMENT

Key personnel and community relations are addressed in this section.

5.1 KEY PERSONNEL

The Project Leader for the SSI was Jairo Guevara. Mark Pinzel and Thea Slone were the Site Safety Officers.

5.2 COMMUNITY RELATIONS

Persons requesting site information will be instructed to submit a Freedom of Information Act Request to: Freedom of Information Officer, U.S. EPA Region VI, 1445 Ross Avenue, Dallas, Texas 75202-2733. Reporters will be instructed to contact the Office of External Affairs at (214) 655-2200.

6. SUMMARY

Bull Oil and Chemical Transporters, Inc. was active from 1981 to 1988. A wide variety of off-spec products (in bulk or drums), contaminated products and manufacturers overstock were bought, stored, repacked and sold by the company. Products handled at the site included still bottoms, spent ethylene glycols, fatty alcohols, solvents, bases and acids. The facility was located on the outskirts of Spring in a rural sparsely populated area.

The EPA ERB started a remedial investigation of the site in June 1988. The wastes sources were removed from the site by the PRPs at the request of the EPA in February 1990. Site characterization and on-site and off-site sampling, including sampling of an adjacent flood control creek, was completed by the TAT in August 1990. On-site soil was contaminated to a depth of seven feet (the deepest level at which soil samples were collected). The most contaminated point was a low ponded area at the northeast side of the site where liquids were confined by berms during site operation. The main contaminants were several chlorinated organic compounds. During site characterization, three monitoring wells, 15-18 feet deep, were installed around the north and east sides of the site. The water table at the site area is approximately 13 feet deep. The wells were contaminated with four chlorinated organic compounds.

The FIT sampled the three wells closest to the site and the most shallow residential wells. No contamination was detected in these wells.

Removal of the soil and replacement of it with clean soil in the contaminated areas is scheduled by the ERB in the near future. A report addressing site characterization findings is in progress by the TAT.

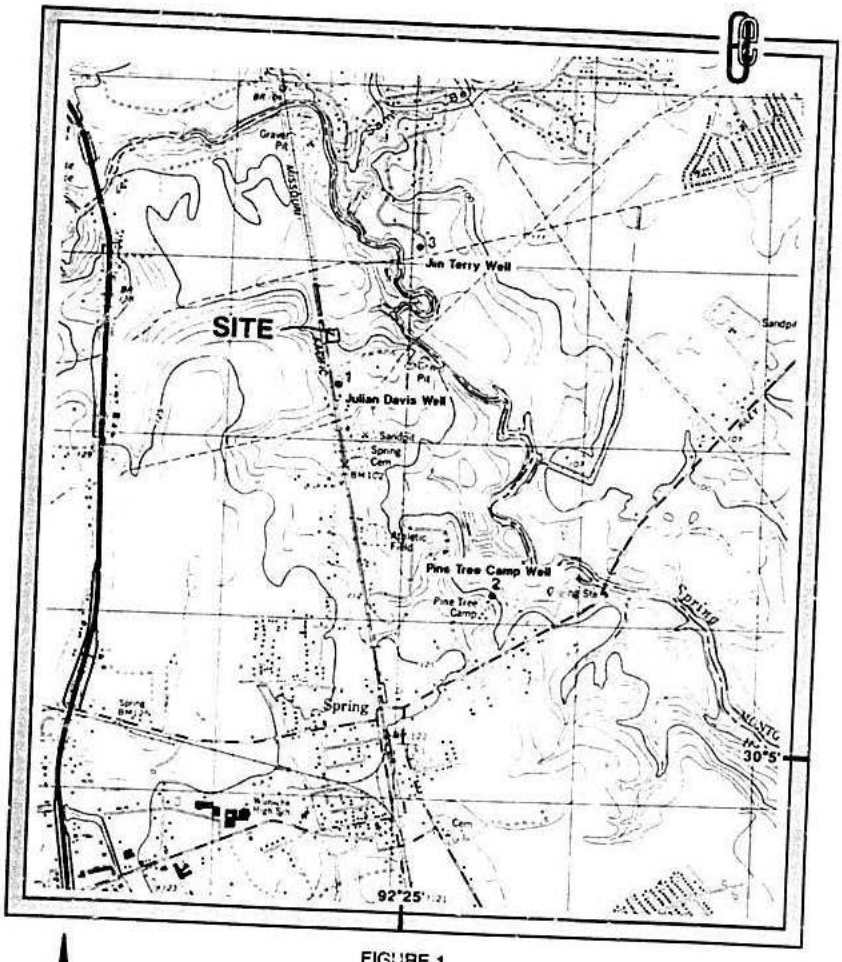


FIGURE 1
SITE LOCATION MAP
WITH RESIDENTIAL WELLS SAMPLED
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

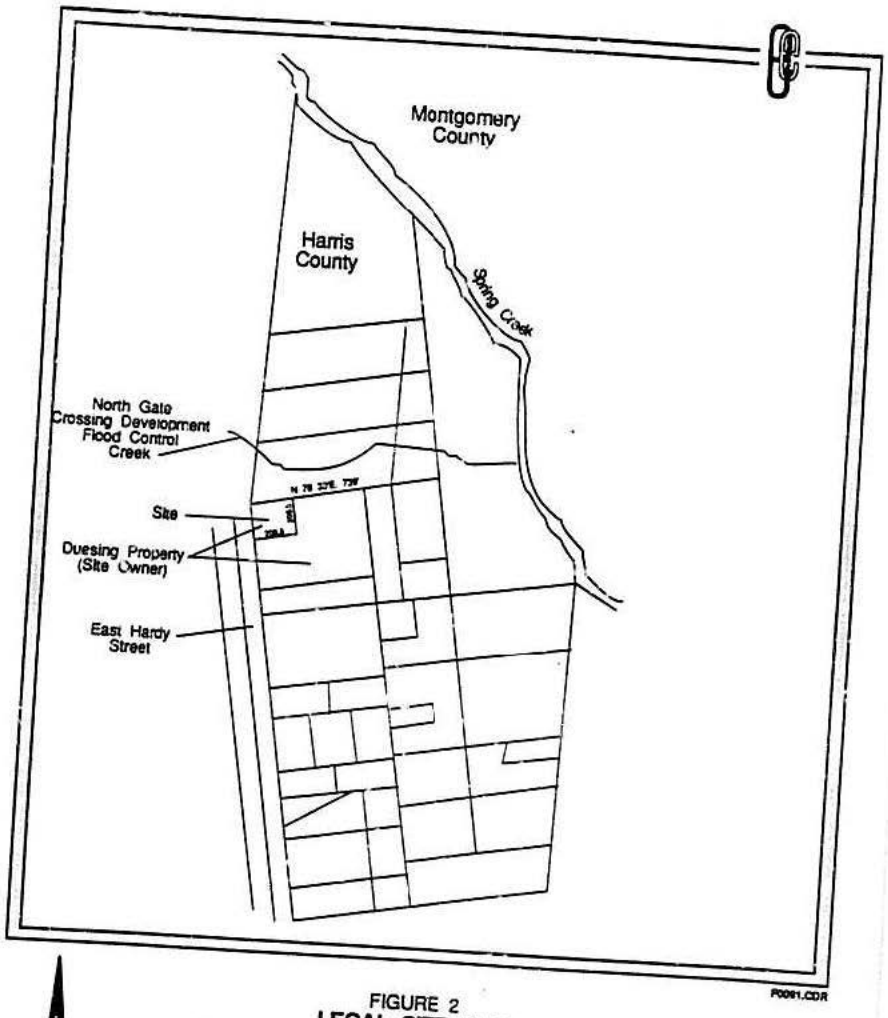


FIGURE 2
LEGAL SITE PLAT
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

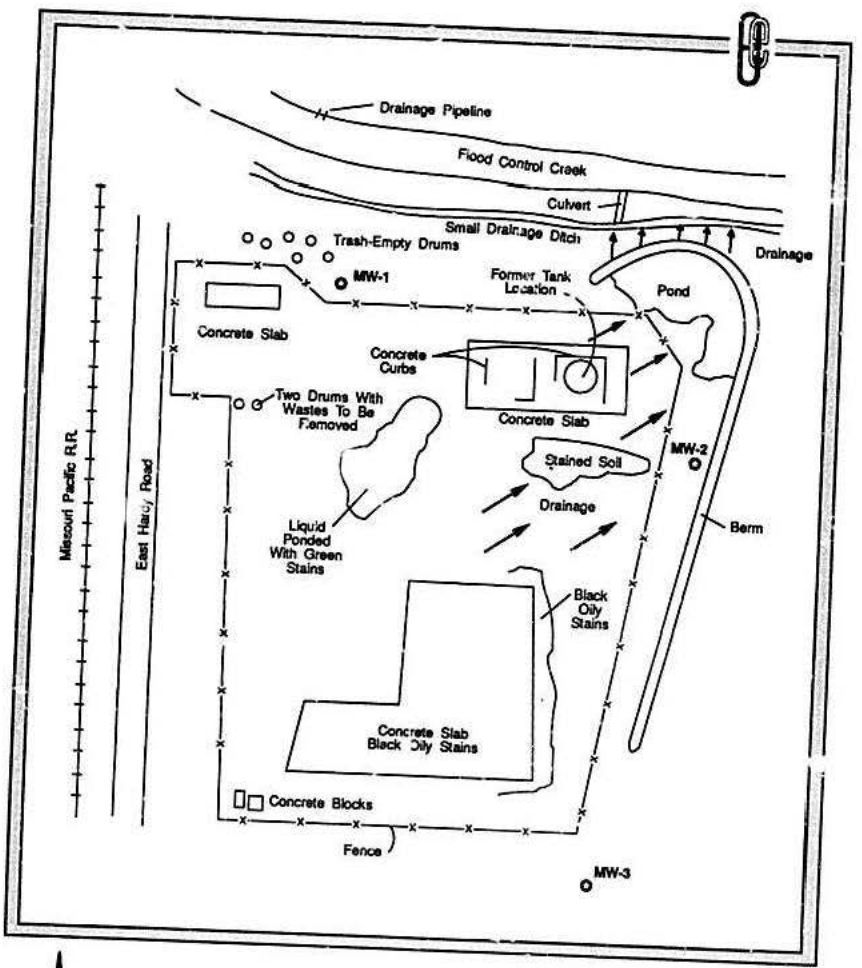


FIGURE 3
SITE SKETCH
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

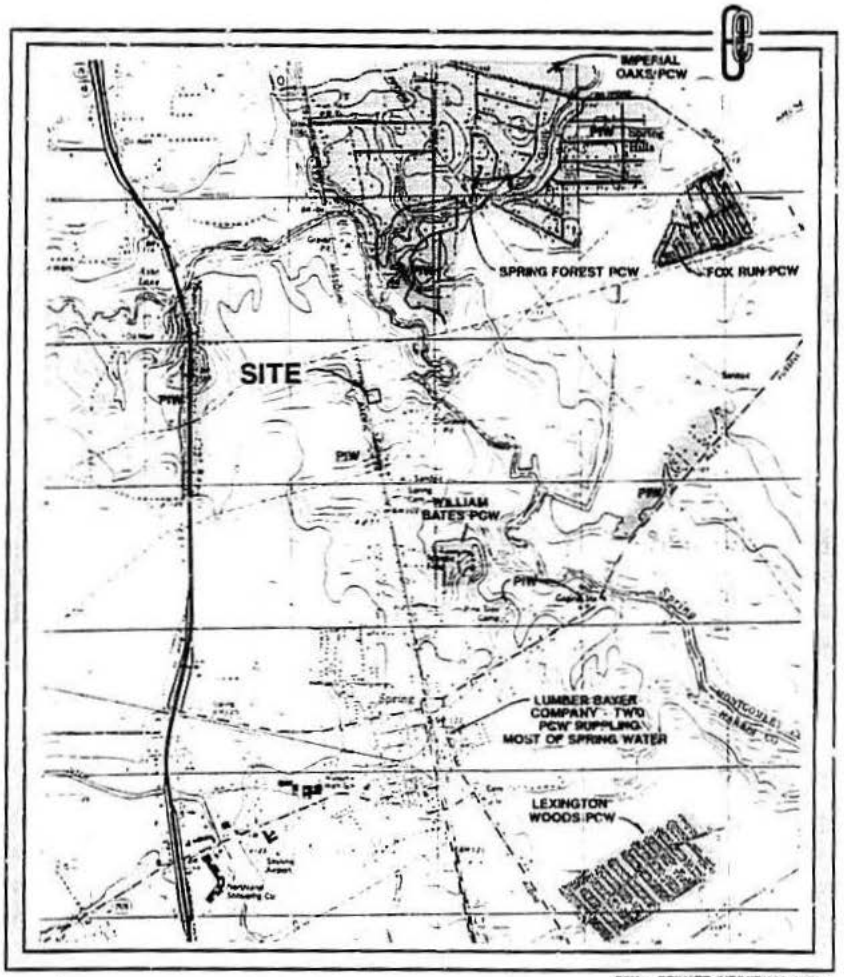


FIGURE 4
PUBLIC SUPPLY AND PRIVATE GROUND WATER WELL LOCATIONS
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

TABLE 1

FIELD MEASUREMENTS

RESIDENTIAL WELL

	Davis	YMCA Pine Tree Camp	Terry
pH (units)	7.9	7.6	7.8
Conductivity (umhos)	40	45	43

TABLE 2

MONITORING WELL ANALYTICAL RESULTS

Well#	MW-1			MW-2			MW-3			Blank
Samples Identified	1A	1B	1C	2A	2B	2C	3A	3B	3C	
Volatile Compounds										
1,2-Dichloroethane	1.9	1.6	1.5	Und	Und	Und	80	60	58	Und
Chloroform	Und	Und	Und	0.1	0.11	0.1	Und	Und	Und	Und
Trichloroethene	Und	Und	Und	0.036	0.038	0.036	Und	Und	Und	Und
Tetrachloroethane	Und	Und	Und	0.042	0.044	0.04	Und	Und	Und	Und

The samples were analyzed by the Keystone Laboratory.

Und = Undetected
Unit = mg/l (ppm)

Source: Ecology and Environment, Inc. TAT (Houston).

ATTACHMENT A

Photodocumentation

Photo No. 1

Site Name:
Bell Oil and Chemical Company Superfund Site

Location:
Spring, TX

CERCLIS #:
TXD[illegible]

Photographer/Witness [illegible]
Date 7/11/92 Time 9:22 Direction E
Description Bulk liquid waste storage tanks

Photo No. 2

Photographer/Witness [illegible]
Date 7/11/92 Time 9:44 Direction E
Description Bulk liquid waste storage tanks

Page 1
Of 2

0 0 0 0 0 5 0 8

Photo No. 3

Site Name:
Bell Oil Well
Chem Trend, Inc
Location:
Spring, Tx
CERCLIS #:
TXD98 [illegible] 741

Photographer/Witness [illegible]
Date 7/11/90 Time 12:43 Direction N
Description Typical Pine Tree Camp Well (STA 2)

Photo No. 4

Photographer/Witness [illegible]
Date 7/11/90 Time 1:05 pm Direction N W
Description Sta Trend well

Page 2
Of 3

Photo No. ____

Site Name:
Bull oil and chem. Transp, Inc.

Location:
Spring, Tx

CERCLIS #:
TXD092488741

NEGATIVES

Photographer/
Date
Description

Photo No. ____

Photographer/
Date
Description

Page 3
Of 3

ATTACHMENT B

Chain of Custody/Receipt for Samples

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
TX8744	BULL OIL & CHEMICAL TRANSPORT

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA EXTRACTABLES	PESTICIDES	VOAS	REMARKS
01	7/11/90	9:36 AM		✓	JULIAN DAVIS WELL	13	6	6	6	TAGS 6-026498 TO 6-027003 VOAS
										6-027004 TO 6-027009 PEST
										6-027010 TO 6-02015 VOAS

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	7/11/90 15:40				
Relinquished by: (Signature)	**Date / Time**	**Received by: (Signature)**	**Relinquished by: (Signature)**	**Date / Time**	**Received by: (Signature)**
Relinquished by: (Signature)	**Date / Time**	**Received for Laboratory by: (Signature)**	**Date / Time**	**Remarks**	
			7/11/90 15:40	REGION VI 31A HOUSTON LAB	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-00249

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: TA 8741 | PROJECT NAME: BUILDING CHEMICAL [illegible]

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	METALS	CYANIDES	HARDNESS	ALKALINITY	BNA EXTRACT	PESTICIDES	VOA	REMARKS
01	7/11/90	9:32		X	Fulton Davis well	2	1	1	1	2				TAGS 6-027016 & 6-027017 METALS
														6-027018 & 6-027019 CYANIDES
														6-027020 & 6-027021 HARDNESS
														6-027022 & 6-027023 ALKALINITY
05	7/11/90	9:27		X	FIELD BLANKS	10	1	1	1	2	2	2		6-027052 & 6-027053 BLANKS
														6-027054 & 6-027055 PEST.
														6-027058 & 6-027059 VOAs
														6-027060 METALS
														6-027061 CYANIDES
														6-027062 HARDNESS
														6-027063 ALKALINITY

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	7/11/90 15:40				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	7/11/90 15:40	ICE CHEST #1 48B TO HOUSTON EPA LAB	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-00250

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO. 7X8741 | PROJECT NAME Bull Oil Environmental Testing

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	BTEX EXTRACTABLES	TCL VOA	TCL B/N	TCL PEST	CYANIDE, SULFIDE, AMMONIA, PHENOLICS	REMARKS
2	7/11/90	1130		✓	Hand Dug Well	10	2	2	2	1	1	1	6-[illegible] BNA/Ext
													6-[illegible] Pest
													6-[illegible] VOA
													6-[illegible] Met.
													6-[illegible] Cyan.
													6-[illegible] Misc.
													6-[illegible] AIR.
4	7/11/90	1150		✓	DO-Inlet Sample Sta. 3	10	2	2	2	1	1	1	6-[illegible] BNA/Ext
													6-[illegible] Pest
													6-[illegible] VOA
													6-[illegible] Met.
													6-[illegible] Cyan.
													6-[illegible] Misc.
													6-[illegible] AIR.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	7/11/90 1540				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	7/11/90 15:46	ICE CHEST 20A EPA HOUSTON LAB	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-00251

E.P.A. 6

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
TX 5141	Bell Oil & Chemical Tank Wells

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PCBs	PESTICIDES	VOAs	METALS	CYANIDES	HARDNESS, ALKALINITY	REMARKS
01	7/11/90	13:37 7:37		✓	Jack Tackett Well	10	6	2	2	1	1	1	TAGS 6-027024 & 6-027025 PCBs 6-027026 & 6-027027 PESTICIDES 6-027038 & 6-027039 VOAs 6-027040 METALS 6-027041 CYANIDES 6-027042 HARDNESS 6-027043 ALKALINITY

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	7/11/90 15:40				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
			7/11/90 15:40	ICE CHEST TO EPA HOUSTON LAB	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-00252

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

7/11/90
(Date)

RECEIPT FOR SAMPLES

NAME AND TITLE OF EPA REPRESENTATIVE: JAIRO A. GUEVARA
EIT CHEMICAL ENGINEER
(Signature)

SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE REQUESTED	SPLIT SAMPLE PROVIDED
01	932 to 943	JULIAN DAVIS well	l.g.	18ℓ	NO	NO

ACKNOWLEDGEMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:
CARRIE DAVIS
2840 E. HARDY, Spring, TX
CAT Carrie P Davis
(Signature)

7/11/90
(Date)

DISTRIBUTION:
One copy facility representative
One copy for inspector's records
Original to Regional Office

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

7/11/90
(Date)

RECEIPT FOR SAMPLES

NAME AND TITLE OF EPA REPRESENTATIVE: JAIRO GUEVARA
FIT CHEMICAL ENGINEER
(Signature)

SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE REQUESTED	SPLIT SAMPLE PROVIDED
2	11:53 To 11:59	YMCA CAMP well	liq	7 L	NO	NO
4	11:59 To 12:05	YMCA CAMP well	liq	7 L	NO	NO

ACKNOWLEDGEMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:
Pamela Cadenhead Director YMCA Camp Pine Tree
709 Riley Fuzzel Spring TX 77373
(Signature)
7/11/90
(Date)

DISTRIBUTION:
One copy facility representative
One copy for inspector's records
Original to Regional Office

V.C.1.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

7/11/90
(Date)

RECEIPT FOR SAMPLES

NAME AND TITLE OF EPA REPRESENTATIVE: JAIRO GUEVARA
EIT - CHEMICAL ENGINEER
(Signature)

SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE REQUESTED	SPLIT SAMPLE PROVIDED
03	13:11 TO 13:14	JIM TERRY WELL	liq	7L	NO	NO

ACKNOWLEDGEMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:
CLARA T TERRY
1818 Spring Creek Dr Spring, TX 77386
Clara T. Terry
(Signature)
7/11/90
(Date)

DISTRIBUTION:
One copy facility representative
One copy for inspector's records
Original to Regional Office

REFERENCES

1 Site Assessment of Bull Oil and Chemical Transporters, Inc., Spring, Texas. Prepared by Ecology and Environment, Inc. TAT for EPA Region VI Emergency Response Branch. October 20, 1988.

2 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Jim Mullins, Emergency Response Branch Supervisor, EPA Region VI. April 19, 1990. TXD092488741.

3 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Bob Allen, Harris County Pollution Control Department. To: David Gonzalez, Superfund EPA Region VI. June 23, 1988. TXD092488741.

4 Memorandum. Bull Oil and Chemical Transporters, Inc. From: Clayton Williamson, City Administrator, City of Tomball. To: Charles H. Duesing, Site Owner. December 19, 1980.

5 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: John Hogue and Tom Spargo, TAT Houston Office. April 10, 1990. TXD092488741.

6 Development of Ground Water in the Houston District, Texas, 1966-1969. Report 152. Texas Water Development Board. June 1972. Second Printing, January 1973.

7 Record of Communication. Bull Oil and Chemical Transporters FIT Reconnaissance Inspection. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Bull Oil and Chemical Transporters File. April 10-11, 1990. TXD092488741.

8 Record of Communication. Spring, Texas Water Supply. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Arthur Bayer, Owner of Bayer Lumber Company. April 10, 1990. TXD092488741.

9 Record of Communication. Community Well at Lesa and Jean, Spring, Texas. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Gil Hitchcock, A-1 Utility Construction Services, Inc., Conroe, Texas. April 12, 1990. TXD092488741.

10 Record of Communication. Residential Wells. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Julian Davis, Residential Well Owner. April 10, 1990. TXD092488741.

REFERENCES

11 Record of Communication. Residential Wells. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Pamela Cadenhead, YMCA Pine Tree Camp Manager. April 11, 1990. TXD092488741.

12 Record of Communication. Residential Wells. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Mrs. Terry, Residential Owner. April 11, 1990. TXD092488741.

13 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Debbie Waughn-Wright, Superfund EPA Region VI. May 4, 1990. TXD092488741.

14 Quality Assurance Project Plan for FIT Activities. February 16, 1990.

15 Screening Site Inspection Work Plan of Bull Oil and Chemical Transporters, Inc., Spring, Texas. Prepared By: Ecology and Environment, Inc. FIT for EPA Region VI. May 21, 1990.

16 Analytical Data of TAT Sampling Inspection Conducted in February, 1990. Prepared By: Ecology and Environment, Inc. TAT for EPA Region VI Emergency Response Branch. May 1990.

17 U.S.G.S. 7.5 Minute Series Topographic Maps (Site Four Mile Radius Map). Spring, Texas, 1982. Maedan, TX, 1982. Tamina, TX, 1961 (Revised 1979). Outlaw Pond, TX, 1959 (Revised 1979).

18 EPA Houston Laboratory Analytical Results of Residential Wells Sampling Near Bull Oil and Chemical Transporters, Inc., Spring, Texas. Sampling Conducted by FIT on July 11, 1990. August 1990.

19 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Moshood Leshi, TAT Site Project Manager. September 12, 1990. TXD092488741.

20 U.S. EPA Final Rule Revised Hazard Ranking System. February 15, 1990.

21 Ground Water Data for Harris County, Texas. Volume II. Records of Wells, 1892-1972 Report 178. Texas Water Development Board. January, 1974.

22 Ground Water Resources of Montgomery County, Texas Report 136. Texas Water Development Board. November 1971, Second Printing August, 1976.

REFERENCES

23 County and City Data Book 1988. U.S. Department of Commerce Bureau of the Census. May, 1988.

24 Record of Communication. Irrigation and Water Intakes From Spring Creek. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Kathy Dean, Agricultural and Extension Service, Houston Office, Houston, Texas. September 20, 1990. TXD092488741.

25 Record of Communication. Aid Warehouse. From: Raymond Wayne, FIT Hydrologist, Ecology and Environment, Inc. To: Dana Barbie, Section Chief, Ground Water and Subsidence Section, U.S. Geological Survey, Houston, Texas. April 20, 1989. TXL987966066.

26 Soil Survey of Harris County, Texas. U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Texas Agricultural Experiment Station and the Harris County Flood Control District. August 1976.

27 Herschfield, D.M. Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40. 1961.

28 Firm Flood Insurance Rate Map Harris County, Texas. Unincorporated Areas Panel 55 of 550 Community Panel Number 4802870055 E. National Flood Insurance Program Federal Emergency Management Agency. February 4, 1988.

29 Texas Surface Water Quality Standards. Texas Department of Water Resources (LP-7). April, 1981.

30 Record of Communication. Critical Habitats and Wetlands Near Bull Oil and Chemical Transporters, Inc., Spring, Texas. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Dr. Steve Spencer, Texas Fish and Wildlife Seabrook, TX Office. September 24, 1990. TXD092488741.

31 Screening Site Inspection Report of Bull Oil and Chemical Transporters, Inc., Spring, Texas. Prepared By Ecology and Environment, Inc., FIT for EPA Region VI. October 3, 1990.

REFERENCE 1

ecology and environment, inc.
6440 HILLCROFT AVENUE, HOUSTON, TEXAS 77081, TEL. 713/771-9460
International Specialists in the Environment

CERCLIS #: TXD092438741

SITE ASSESSMENT REPORT

FOR

BULL CHEMICAL
Spring, Harris County, Texas

Prepared for

EPA - Region VI
Emergency Response Branch

J. Chris Petersen
Deputy Project Officer

By

Ecology and Environment, Inc.
Technical Assistance Team

October 20, 1988

ecology and environment, inc.
6440 HILLCROFT AVENUE, HOUSTON, TEXAS 77081, TEL. 713/771 9460
International Specialists in the Environment

DATE: October 20, 1988 CERCLIS #: TXD09248874

TO: Mary Ellen McClary, OSC
EPA Region VI, Emergency Response Branch

THRU: J. Chris Petersen, DPO
EPA Region VI, Emergency Response Branch

THRU: Kishor Fruitwala, TATL
Region VI, Technical Assistance Team

FROM: Richard Yeager
Region VI, Technical Assistance Team

SUBJECT: Bull Chemical Site Assessment
Spring, Harris County, Texas

TDD #: T06-8810-24
PAN #: TTX 0114 SAB

On July 15, 1988, TAT was tasked by OSC Mary Ellen McClary to perform a site assessment at Bull Chemical on July 18, 1988. Bull Chemical is an active chemical storage and bulking operation located at 28528 East Hardy Street, Spring, Harris County, Texas.

File Review

Bull Chemical has been the subject of several Harris County Pollution Control Department (HCPCD) investigations from 1980 to the present. Up to 1981, Bull Chemical operated in the city of Tomball. After numerous complaints, the operation moved to its present location, where it has been the subject of investigations by HCPCD, EPA, Texas Water Commission (TWC), Texas Air Control Board (TACB) and Harris County. Several investigations by HCPCD in 1988 prompted HCPCD to request assistance from EPA to further evaluate the public health and environmental threat posed by Bull Chemical. EPA Emergency Response Branch became involved as a result of this request.

TAT Site Assessments

On July 18, 1988, TAT members Holly Gray and Richard Yeager accompanied OSCs Mary Ellen McClary and David Dodgen to Bull Chemical. A meeting was held at the site with Mrs. Duesing (wife of the recently-deceased owner of the facility), Mr. Robert Lee, (assisting Mrs. Duesing with Mr. Duesing's unfinished business), and Darhl Ferraro and Robert Allen, both of HCPCD. The OSCs explained to Mr. Lee and Mrs. Duesing CERCLA and SARA regulations and EPA's involvement in the site.

At 1040 hours, TAT was requested to perform air monitoring on the property. TAT used the Organic Vapor Analyzer (OVA), O_2 meter/explosimeter, HCN and H_2S monitoxes and RAM IV radiation detector to perform ambient air monitoring on site. Weather conditions were bright sunshine, temperature in the lower 90's F and high humidity. TAT entered the drum area in safety level "C" to perform air monitoring and photodocument site conditions. The background reading for the OVA was 1 unit methane equivalent. The HCN monitox displayed a reading of 4-7 ppm in upwind offsite areas, and remained the same on site. The monitox was thought to be affected by the high heat and humidity. Most OVA readings in the vicinity of the drums were within 0.5 units of background. One reading at the top of drum labeled "isopropyl benzene" was 6 units methane equivalent above background. The condition of the drums at the site was fair to poor in most instances. Many of the drums were stacked 3-high in unstable positions. Several drums were observed to be leaking into and out of concrete containments. Several tanks were also present which were used to store product. TAT then exited the hot zone and reported conditions to OSC McClary. It was decided that TAT would perform offsite soil, water and air sampling after a two-week period had passed.

TAT returned to the site on August 11, 1988, intending to perform soil/sediment, water, and air sampling. Prior to sampling, TATs Charles Wisnieski, Ralph Holsworth, and OSC McClary performed air monitoring along the site boundary. OVA readings were 2 units methane equivalent over background along the western boundary, 3 units over background along the southern boundary, and 3 units over background along the eastern boundary. Along the northern boundary, next to a concrete pad with styrene drums, readings in ambient air were 20-30 units methane equivalent in the breathing zone. (The OSHA maximum allowable exposure 8-hour Time Weighted Average for styrene is 100 ppm). Formaldehyde, benzene, and styrene colorimetric tubes were also used on site. Styrene was the only tube which gave a positive indication. After performing the air monitoring, TAT consulted with the OSC to determine the best places to sample the drainage pathways. Soon afterwards, a steady rain began to fall. The weather forecast was heavy rain for the remainder of the day. Because of reduced efficiency of Air Purifying Respirators (APRs) in rainy conditions, slippery footing, and reduced absorption capacity of charcoal tubes used in air sampling, it was agreed to postpone the sampling mission until August 15, 1988.

At 0800 hours on August 15, 1988, TATs Yeager, Wisnieski, Aguirre, Gray and Taormina returned to the site to perform sampling. Team designations were: Yeager, Team Leader, Aguirre, site safety officer and air sampling; Gray sample Chain-of-Custody; Taormina, air sampling; and Wisnieski; soil/water sampling. The weather was sunny, with a light breeze out of the east, and temperature in the low 80's, increasing to 95 F at 1600 hours.

After setting up a command post at the northern terminus of E. Hardy Street, TAT executed the sampling program. Three water and eight surface (0 - 3 inches) sediment/soil samples were taken in off site drainage paths. The soil/water sampling plan was designed to detect possible offsite migration of chemicals.

Offsite Sampling

August 15, 1988

Sample #	Location	Analytical Parameters	Type
1	Downstream, approx. 200 NE of site	Full HSL priority pollutants	Water
2	Downstream, approx. 200' NE of site	A/A	Sediment
3	Confluence of site drainage and creek, approx. 200' N of the site	A/A	Sediment
4	Upstream, bridge at East Hardy Street	A/A	Water (Background)
5	Upstream, bridge at East Hardy Street	A/A	Sediment (Background)
6	Drainage path, 50' west of ponded area on site	A/A	Sediment
7	Drainage path, 20' west of ponded area on site	A/A	Sediment
8	South end of drainage pipe 100' north of site	A/A	Sediment
9	Soil beneath white material near NW corner of site	A/A	Soil
10	Ponded drainage, NE section of site	A/A	Water
11	Ponded drainage NE section of site	A/A	Sediment

Offsite air sampling was also performed in order to determine if fugitive emissions were escaping the site. Six specific chemicals were analyzed for in the air samples. These were benzene, acrylonitrile, 1,2 dichloropropane, 1,2 dichloroethane, chloroform, and carbon tetrachloride. These chemicals were chosen on the basis of: the inventory of chemicals on site, previous detection by HCPCD, low-concentration permissible exposure limits (PEL), and relatively high vapor pressures. The samples were collected in accordance with NIOSH Method 1003, with a sample collection period of approximately 3 hours 10 minutes and a flow rate of 0.05 l/min. Seven samples were collected

Offsite Sampling

August 15, 1988

Sample #	Location	Analytical Parameters	Type
1	Downstream, approx. 200 NE of site	Full HSL priority pollutants	Water
2	Downstream, approx. 200' NE of site	A/A	Sediment
3	Confluence of site drainage and creek, approx. 200' N of the site	A/A	Sediment
4	Upstream, bridge at East Hardy Street	A/A	Water (Background)
5	Upstream, bridge at East Hardy Street	A/A	Sediment (Background)
6	Drainage path, 50' west of ponded area on site	A/A	Sediment
7	Drainage path, 20' west of ponded area on site	A/A	Sediment
8	South end of drainage pipe 100' north of site	A/A	Sediment
9	Soil beneath white material near NW corner of site	A/A	Soil
10	Ponded drainage, NE section of site	A/A	Water
11	Ponded drainage NE section of site	A/A	Sediment

Offsite air sampling was also performed in order to determine if fugitive emissions were escaping the site. Six specific chemicals were analyzed for in the air samples. These were benzene, acrylonitrile, 1,2 dichloropropane, 1,2 dichloroethane, chloroform, and carbon tetrachloride. These chemicals were chosen on the basis of: the inventory of chemicals on site, previous detection by HCPCD, low-concentration permissible exposure limits (PEL), and relatively high vapor pressures. The samples were collected in accordance with NIOSH Method 1003, with a sample collection period of approximately 3 hours 10 minutes and a flow rate of 0.05 l/min. Seven samples were collected

in both upwind and downwind areas from the site. A field blank and an unopened blank were also sent to the laboratory for analysis. The following is a list of air sampling locations.

Air Sampling Location

Sample #	Location	Analytical Parameters	Type
A1	150'S of West Gate,	Benzene, Acrylonitrile, 1,2 dichloropropane, 1,2 dichloroethane, chloroform, carbon tetrachloride	Air, downwind
A2	185' S of west gate	A/A	Air, downwind
A3	145' E of SW corner	A/A	Air, upwind
A4	1d5' E of NW corner	A/A	Air, downwind
A5	115' E of NW corner	A/A	Air, downwind
A6	90' S of west gate	A/A	Air, downwind
A7	30' E of NW corner	A/A	Air, downwind
A8	Field blank, opened on site		
A9	Unopened field blank		

Results of soil/water sampling

Water

Three water samples were taken. These were located upstream from off-site drainage, downstream from offsite drainage, and in the ponded drainage located in the northeast area of the facility. Analysis for metals in the water was, for the most part, unremarkable. Upstream and on-site water sample concentration for chromium and lead were above primary drinking water standards; however, because the upstream sample is considered to be background, the on-site sample must also be considered to be within the natural range for the location. A pH of 9.5 units was recorded in the on-site ponded water. This was slightly higher than the pH of 7 recorded in the upstream and downstream locations.

Organics analysis revealed significant concentrations of 1,1,1-trichloroethane and trichloroetnene in sample #10, located in the on-site ponded drainage. The concentrations were 1,060,000 ug/kg and 3,710,000 ug/kg, respectively. No other tentatively identified volatile compounds were found; however, a variety

of unknown non-hazardous substance list acid base/neutral compounds were found in this sample. It should be noted that there are hazardous substances on the site which are not HSL priority pollutants. It should also be noted that a yellowish substance was visible in the ponded drainage. This substance was observed to be heavier than water, because it appeared on the soil/water interface.

Soil/Sediment

Metals analysis revealed concentrations which are typical for this region. Organic analysis in sample #7, taken in the off-site drainage path revealed one unidentified semi-volatile compound. Sample 11, taken from the sediment in the ponded drainage, revealed a variety of unknown semi-volatile organic compounds and an acetone concentration of 46.7 ug/kg.

Result of Air Sampling

The laboratory analyses of the charcoal tubes revealed that concentrations of the six compounds are below the detection limits of the method. While the method used has detection limits which are in the range of the Threshold Limit Values (TLV), ambient air quality criteria are below the detection limit of this method. Although there are no EPA criteria for volatile organics in ambient air, Texas Air Control Board (TACB) uses a value of TLV divided by 100 to screen facilities for its permitting process. It is conceivable that fugitive emissions were escaping the site within this range. It should also be noted that HCPCD detected hydrocarbons using this method. However, the HCPCD samples were taken in work areas on the site when bulking operations were active. Also, sorption of compounds in the charcoal tends to be retarded when high humidity conditions exist. The humidity on August 15 was fairly high, as it normally is during summer months in this region.

Discussion of Soil/Sediment and Water Sampling Results

With the presence of leaking drums and visible drainage pathways from the site, the question has arisen about why the samples in the offsite drainage paths did not detect the presence of contaminants. Several explanations are conceivable. Since many of the compounds are fairly volatile, they may volatilize before leaving the site. Also, the samples were taken several months after the facility ceased active operations. Spills of solvents may have been previously washed offsite during rainstorms. In TAT's opinion, the most likely route of contaminants from the site would be infiltration and subsequent advection by groundwater flow. The sandy soil observed in the area facilitates downward migration.

Other Observations Pertinent to the Site Assessment

It should be noted that Bull Chemical is readily accessible from its northern boundary. A six-foot chain link fence bounds the site on the western and

southern boundaries. A berm, along with debris, forms the eastern boundary of the facility.

The potential for fire and subsequent release of volatile organics is high should an accident occur or if the facility is struck by lightning. Many flammable solvents are present on site.

The site slopes to the north, and drainage seems to coalesce toward the northeast section of the site at a small containment area. However, the containment is not adequate because several eroded drainage pathways are visible to the west of the containment area. Offsite, the drainage coalesces to a drainpipe, which conducts runoff water to the stream north of the site. The creek flows directly into Spring Creek. Spring Creek is a major tributary to the Lake Houston, a major surface water supply for Houston.

The facility is located in a rural, sparsely populated area in northern Harris County. The nearest residence is about 1/10 mile to the south of the site. Other residences are located farther south along E. Hardy Street. A portion of Spring is located within a one-mile radius of the site. E. Hardy Street does not appear to be heavily traveled at the present time, but traffic may increase when the bridge to the north of the site is completed. A water well survey of the area was not undertaken.

List of Attachments:

Chemical Properties of Detected Substances
Summary of Metals Analysis
Location Map (USGS)
Site Sketch
Mounted Photographs
Unused Photographs and Negatives
TAT Field Notes
Records of Communication
Sample Chain of Custody Forms
Air Sampling Data Sheets
Laboratory Analysis
Sampling Plan
Bull Chemical Inventory
Copy of TDD#: T06-8610-24

Summary of Inorganic Analysis

Inorganic Water ug/L

Traffic Form					Drinking Wtr std SDWA (ppb)	
Aluminum	85300	91200	60100			
Antimony	ND	ND	ND			
Arsenic	ND	ND	15		50 p	
Barium	397	432	530		1,000 p	
Beryllium	7	7	ND			
Cadmium	ND	ND	ND		10 p	
Chromium	99	103	179		50 p	
Cobalt	33	35	25			
Copper	40	50	89		1000 s	
Iron	72300	73400	46600		300 s	
Lead	ND	57	143		50 p	
Magnesium	12500	12700	10900			
Manganese	608	599	961		50 s	
Mercury	ND	ND	0.3		2 p	
Nickel	47	46	86			
Potassium	11100	11300	18700			
Selenium	ND	ND	ND		10 p	
Silver	ND	ND	ND		50 p.	
Sodium	24700	24000	30000			
Thallium	ND	ND	ND			
Tin						
Vanadium	155	158	104			
Zinc	136	147	992		5000 s	
Cyanide	ND	ND	0.03			
Calcium	33200	32700	29400			
Sample Location	1	4 Background	10			

Summary of Inorganic Analysis

INORGANIC Sediment/Soil mg/kg

Traffic Form						
Aluminum	1350	6400	1440	9110	11800	2850
Antimony	ND	ND	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND	11	ND
Barium	18	153	36	101	158	101
Beryllium	ND	1	ND	2	5	1
Cadmium	ND	ND	ND	ND	NT	ND
Chromium	1	6	2	9	28	3
Cobalt	ND	4	ND	3	5	ND
Copper	6	8	6	21	18	5
Iron	1210	5140	1260	7860	22300	3160
Lead	ND	ND	ND	12	ND	ND
Magnesium	110	735	169	1114	958	310
Manganese	24	120	25	108	290	122
Mercury	ND	ND	ND	ND	ND	ND
Nickel	3	6	ND	8	12	4
Potassium	161	500	202	772	751	286
Selenium	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND
Sodium	ND	328	76	247	289	239
Thallium	ND	ND	ND	ND	ND	ND
Tin						
Vanadium	4	13	4	17	52	9
Zinc	ND	ND	ND	30	18	ND
Cyanide	ND	ND	ND	ND	ND	ND
Calcium	316	1800	2386	9470	12400	671
Sample Location	2	3	5 BCKgd	6	7	8

Summary of Inorganic Analysis

Pentewan Sediment/Soil mg/kg

Traffic Form						
Aluminum	9730	3230				
Antimony	ND	ND				
Arsenic	ND	ND				
Barium	100	54				
Beryllium	2	1				
Cadmium	ND	ND				
Chromium	11	10				
Cobalt	3	ND				
Copper	6	7				
Iron	8790	5170				
Lead	10	6				
Magnesium	894	756				
Manganese	95	80				
Mercury	ND	ND				
Nickel	7	8				
Potassium	526	560				
Selenium	ND	ND				
Silver	ND	ND				
Sodium	237	915				
Thallium	ND	ND				
Tin						
Vanadium	22	8				
Zinc	23	6				
Cyanide	ND	ND				
Calcium	5130	42400				
Sample Location	9	11				

BULL CHEMICAL BULK INVENTORY

8/11/88

TANK		QUANTITY
1	A) Toluene Diamine	
	B) Empty	1,700 Gal
	C) Chloroform (sold subject to sample approval)	2,000
2	Empty	
3	Empty	
4	Empty	
5	Bulk waste for disposal	3,500
6	A) Propylene Dichloride	600
	B) Butynol	700
	C) Polyol	600
	D) Propylene Dichloride	2,500
7	Carbon Tetrachloride (to be sealed for disposal)	4,000
8	Acrylonitrile (sold)	4,000
9	Styrene Monomer (sold)	1,800
10	Propylene Dichloride	400
11	A) MTBE (analysis sent pending purchase)	
	B) Butyl Alcohol "	
	C) Acetone (sold)	
12	THF/ H2O (consignment) (samples have been sent to customers)	
13	Empty	6,000
14	THF/ H2O (consignment) (samples have been sent to customers)	
15	Bulk waste for disposal	4,000
		4,000
16	Road tanker VAM (sold)	2,000

CHEMICALS AVAILABLE IN HOUSTON THAT MUST BE MOVED ASAP. 8/5/81

Some suggested prices are listed, but if you have any interest make an offer. This is truly a close-out sale.

	No. of Dr	NAME	Possible Use	Price/lb	
a.	12	Amyl Alcohol	Solvent, synthethis	15	•
b.	4	Isoamyl Alchhol	" "	10	
c.	22	Dodecyl Benzene	Lubricants, for sulfonation	20	•
d.	14 exc cond.	o-Cresol (solid)	Disinfectant, Resins Synthesis	45	•
e.	8	Acetaldoxime, 50% (DuPont)	Intermediate	12	
f.	19	Enj 941	Industrial Solvent	12	•
g.	5	Epal 10,12	Mfgr into Surf. Solvent	20	•
h.	5	Olefin C-1618	"	20	•
i.	7	Olefin-C-1824	"	20	•
j.	51	Alpha Olefin C-28/30 (Gulf) (waxy matr)	Lubricant	15	
k.	190	o-Toluene Diamine ca 3/50 o/m	Dyeing, Intermediate	.7	
l.	3	Chloroform	Solvent	5	
m.	21	Perchloroethylene	"	15	
n.	18	Trichloroethylene	"	22	
o.	50	Carbon Tetrachloride	" "	45	
p.	15	Biphenyl	Synthesis, Fungistat Dyeing	15	(sold)
q.	20,	Butene 2-Diol	Corrosion Inhibitor, Defoliant	25	•
r.	12	Exxate 600 (Exxon) 700	Solvent, somewhat like the decyl alcohols	12	•

Chem-Find, Inc
713/937-7224 or
883/862-5556
Please call me,
Ed Mills

* Brownsville

8/5/88

PRODUCTS AND CHEMICALS AVAILABLE IN HOUSTON THAT MUST BE MOVED ASAP.
Make an offer; this is really a final sale. Call 937-7224.

	a.	10 dr	Acetic Acid, 55 gal Plastic Drum (PD) 62 - 9 on current Nos
	b.	4	Acetic Anhydride, 38/62; 2 are just ½ full 155 158B 167F
50	c.	2	Acetophenone 159 159A
31	d.	1	ADMA WC Alkyldimethylamine
16A	e.	3/4	Aluminum Chloride, liquid 319# . 161 may be same - ½ PD
69	f.	1 & ½	Ammonium Thio Sulfate
83, 85	g.	2	Aluminum Sulfate, liquid, each 2/3 full
134	h.	8	ARCO A2P Bottoms
81	i.	1	Barquat MX, 310 lbs
18	j.	1	Barquat 50, 310 lbs
6, 47	k.	1 & ½	BM-10 Cleaning Compound
28	l.	1	Chemex 2186
3	m.	1	Chemex 2189
84	n.	2/3	N,N, Dimethyl Formamide, foundry grade
1	o.	5	Ethyl Acetoacetate, 460 lbs each ÷ 74, 76, 75 77
	p.	3 & 1/3	Mayoquest 1500, like Dequest 2010 34, 57, 59, 86
89	q.	1	Mayoquest 1635
7	r.	1	Methyl Benzyl Alcohol
30	s.	1	Ortho Ethylaniline (Ethyl)
160	t.	2	Phenol, solid, each about 2/3
23	u.	1	90% Phenol, 10% Water (Marichem)
	v.	½	Poly GMI-5100 33, 57, 59
			Poly 250-5100
61	w.	1	Sodium Bichromate, almost full
40	x.	1	Sodium Glucoheptonate
113	y.	1	Sodium Meta Silicate
79, 43	z.	2	Sulfuric Acid, 750 lbs each
84, 86A	a-1	1 & ½	Tamol 850, approx 500 lbs
	b-1	3 & ½	Triethyl Amine 118, 121, 123 - ½ tote in 123
142	c-1	1	Vinyl Cyclohexene (DuPont)
63	d-1	1	Zinc Chloride Solution, 30 gal P Dr

ChemeFind, Inc
937-7224
Ed Mills

Reference 2

RECORD OF COMMUNICATION	(Record of Item Checked Below) ___Phone Call _/_ Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Jim Mullins EPA ERB (214) 655-2270	From: Jairo Guevara FIT Chemical Engineer	Date: 4-19-90 Time: 2:00 p.m.

SUBJECT: Bull Oil and Chemical Transporters, Inc. Site in Spring, TX

SUMMARY OF COMMUNICATION

Mr. Mullins stated that:

1. Off spec products were sold to Bull Oil by companies such as Exxon and Olin Corporation.
2. The assessment inspection of the site was prompted by midnight dumping outside the gate of Bull Chemical and poor operation of the site (several drums were leaking).
3. The drums and tanks with wastes were removed by the responsible parties under request of EPA.

Exxon

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA BQ Form 5300-3 which may be used until Supply is Exhausted.

REFERENCE 3

Record of Communication
09/22/88 - 3:00 P.M.

re: Bull Oil & Chemical Transport
(TXD092488741)

From: Bob Allen (Harris County Pollution Control Dept.)
To: David Gonzalez (6H-ES)

Bob Allen called to relay some recent information on the Bull Oil & Chemical Transport site. He told me that the Harris County Pollution Control Dept. has been working with the owner at this facility to clean up approximately 1000 drums of miscellaneous chemicals which are in various stages of decay. He told me that progress was being made towards this clean-up when the owner recently died. The person currently in charge apparently does not have the financial resources to properly dispose of the material in the drums. The drums are piled up with improper silo space on a concrete pad with a small concrete dike surrounding this pad. Some of the drums have been at this location since 1980 or 1982. In addition, the facility is completely fenced in and there are not any residential areas nearby. However, there is a wide assortment of chemicals present which includes creosols, acids, bases, acrylonitrile, etc. One of the primary concerns at this site is that the drainage pathways from the facility flow into nearby (250 yds) Spring Creek which flows into Lake Houston, a drinking water source for the city of Houston. He said that he would send a copy of a report on this site that the HCPCD had completed. At the present, the HCPCD has exhausted their authority towards cleaning up the site and is referring this site to the EPA for further evaluation.

Action Taken:

(1) Notify Emergency Response
(2) Notify RCRA
(3) Call Bob Allen back to let him know the status of the EPA response.

REFERENCE 4

...g Looney, Mayor

City Secretary
Tax Assessor-Collector
Shirley England

CITY OF TOMBALL

401 W. Market St. — Tomball, Texas 77375
713/351-5421

December 19, 1980

Mr. Charles H. Duesing
Bull Oil and Chemical Transporters, Inc.
6327 Derby Way
Spring, Texas 77379

Dear Mr. Duesing,

The order to abate a nuisance by removal of chemicals, barrels, tank trailers, contaminated soil and vegetation from the Bull Oil and Chemical Transporters, Inc. storage facility on Sycamore Street in Tomball is still in effect. You are in violation of this ordinance as already decided in Municipal Court on December 17, 1980.

You are hereby notified by the City of Tomball that all debris, trash, barrels and tank trailers must be removed from the corporate limits of Tomball by 8:00 A.M., CST, January 12, 1981 and both transported and disposed of in a lawful manner. You are also required to remove any vegetation, soil, water, etc. which has been contaminated at that location from the corporate limits of Tomball in accordance with appropriate regulations of the Texas Department of Water Resources and any other regulations or laws by 8:00 A.M. CST, January 12, 1981.

Failure to obey an order to abate a nuisance shall result in charges being filed in Municipal Court, which each day constituting a separate offense, with each offense punishable upon conviction with a maximum fine of $200.

You will also be receiving notification of junk vehicle ordinances at that location by the Tomball Police Department, which is a separate action that must be handled with that department.

RECEIVED
DEC 29 1980
DEPT. OF
WATER RESOURCES
DISTRICT 7

Sincerely,
Clayton Williamson
Clayton Williamson
City Administrator
City of Tomball

recycled paper

cc/ John A. Skurlin

Reference 5

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call _x_Discussion __Field Trip __Confe ance __Other(Specify)	
To: John Hogue and Tom Spargo TAT Region VI Houston Office (713) 771-9460	From: Jairo Guevara FIT Chemical Engineer	Date: 4/10/90 Time: 11:00 a.m.

SUBJECT: Bull Oil and Chemical Transporters, Inc.

SUMMARY OF COMMUNICATION

John Hogue and Tom Spargo stated that:

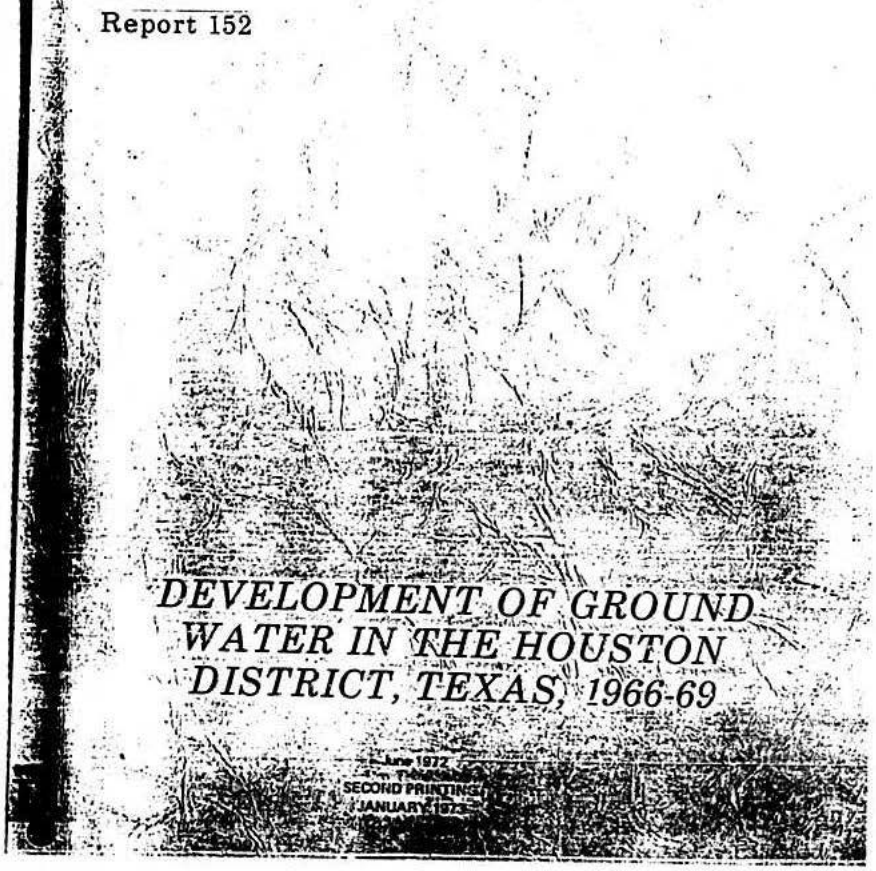
1. The removal of the vastes (bulk tanks) and drums was completed in February 1990. Two re-packed drums with vastes remain on-site. Appropriate action is being taken to remove them from the site.
2. The ground vater direction apparently is toward Spring Creek (NE).
3. Three monitoring vells with piezometers were installed in February 1990 a the perimeter of tha site. Two of these vells are 15 feet deep and the third is 18 feet deep.
4. Mr. Duesing built dikes in the north and east side of the lov ponded area to retain liquids migrating from the site. Also, a berm was built along the east side of the site to direct the drainage into tha lov ponded area.
5. TAT conducted off-site soil sampling along the perimeter of the site. Also, an on-site and off-site soil gas survey vas conducted by the TAT with a PhotoVac Unit. The results of the perimeter sampling are not known. The soil gas survey indicated that the lov ponded area is the most contaminated. These inspections were conducted during January-February 1990.
6. TAT plans to evacuate the lov ponded area, remove the contaminated soil and refill the area with clean soil. Other contaminated soil on-site and off-site will be removed and replaced with clean soil.
7. The vastes handled by the site vere liquids.

EPA FORM 1300-6 (7-72)
Replaces EPA BQ Form 5300-3 which may be used until Supply is Exhausted.

REFERENCE G

TEXAS
WATER
DEVELOPMENT
BOARD

Report 152



DEVELOPMENT OF GROUND WATER IN THE HOUSTON DISTRICT, TEXAS, 1966-69

June 1972
SECOND PRINTING
JANUARY 1973

DEVELOPMENT OF GROUND WATER IN THE HOUSTON DISTRICT, TEXAS, 1966-69

INTRODUCTION

Collection of data to define the ground-water resources in and around Houston, Texas, was begun by the U.S. Geological Survey about 1929. The present program of collection and dissemination of data is a cooperative effort by the U.S. Geological Survey, the Texas Water Development Board, and the cities of Houston and Galveston.

Many reports describing the geology and ground-water resources of the Houston district have been published. Some of the more comprehensive reports are listed in the "Selected References" at the end of this report. The most recent report summarizing the geology and hydrology of the Houston district is by Gabrysch (1967), the report also presents data on pumpage, changes in water levels, and information on land-surface subsidence.

As a result of recent studies in the coastal area of southeast Texas, it is now possible to define better the aquifer system in the Houston district. A mapping program to delineate the aquifers in the district is presently (1970) underway, and these maps will be presented in later reports.

The Houston district, as described in this report, includes all of Harris and Galveston Counties and parts of Chambers, Liberty, Montgomery, Waller, Fort Bend, and Brazoria Counties (Figure 1). Previous reports in this program described the same areas, but the ground-water conditions in Galveston County were reported separately. Galveston County is now included in the Houston district because of the related effects of extensive ground-water development in southeastern Harris County.

The author expresses his appreciation to the well drillers, industrial plant officials, municipal officials, and many well owners who contributed data used in this report. The cooperation and assistance of D. E. Van Buskirk, Superintendent of Production, Water Division, city of Houston, greatly facilitated data collection and preparation of this report.

Figure 1.—Index Map Showing Area of Report

AQUIFERS

The aquifers in the Houston district are composed of sand and clay beds that are not persistent in lithology or thickness. The beds grade into each other both laterally and vertically within short distances; consequently, differentiation of geologic formations on drillers' and electrical logs is almost impossible. However, White and others (1944, p. 146-147) and Lang and others (1950, p. 37) divided the aquifer system into seven zones based on the predominance of sand or clay. In the Houston District, water is being pumped only from sands above zone 2, a clay zone that contains some of the most continuous beds in the area.

The Alta Loma Sand of Rose (1943) (hereafter referred to as the Alta Loma Sand), which is the major aquifer in Galveston County and southern Harris County, is an exception in that it can be traced in the subsurface for great distances. The Alta Loma Sand is massive and about twice as permeable as the underlying sands, referred to by Wood and Gabrysch (1965) as the

Reference 7

RECORD OF COMMUNICATION	(Record of Item Checked Below) ___ Phone Call ___Discussion _/_ Field Trip ___Conference ___Other(Specify)	
To: Bull Chemical and Oil Transporters, Inc. file	From: Jairo Guevara FIT Chemical Engineer	Date: 4/10-11/90 Time: 11:00 a.m.

SUBJECT: Bull Chemical and Oil Transporters, Inc.

SUMMARY OF COMMUNICATION

The following is a summary of the FIT Reconnaissance Inspection conducted on April 10-11, 1990:

1. Two drums, labeled 11 PR36144 and 14 PR36144, with wastes, were observed on-site. These drums are to be removed by the responsible party at a later date.
2. The site area water supply is from public and private ground water wells.
3. Four residences south of the site on East Hardy Street use private wells as a source of drinking water.
4. Three private wells are located on Riley Fuzzell Road west of Spring Creek.
5. The Spring Hill (Sections 1, 2 and 3) north of the site use private wells as a source of drinking water.
6. The three monitoring wells installed by the TAT are outside the site, which is completely fenced, not secured and without casing.
7. The low ponded area is not secured (located outside the site fence).
8. No readings of volatiles were measured when an HNu was used by the FIT during the reconnaissance inspection.
9. The north gate crossing development flood control creek which receives any drainage from the site is approximately 200 feet from the site.
10. No commercial agriculture, commercial silviculture or recreation area was observed within 1/2 mile of the site.

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 8

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call _x_Discussion __Field Trip __Conference __Other(Specify)	
To: Arthur Bayer Owner of Bayer Lumber Company (713) 353-2215	From: Jairo Guevara FIT Chemical Engineer	Date: 4/10/90 Time: 9:00 a.m.

SUBJECT: Spring, Texas Water Supply

SUMMARY OF COMMUNICATION

Mr. Bayer stated that:

1. Bayer Lumber Company is the largest supplier of drinking water in Spring, Texas.
2. The town water is distributed from two wells located at the Bayer Lumber Company south of the Bull Chemical site. The wells are 195 and 538 feet deep. The 538 foot well is first screened between 290 and 310 feet. The wells serve 284 homes.
3. A public well supplies water to the subdivision of Lexington Woods south of Bull Chemical.
4. North of the site in Montgomery County, a public well from Consumer Water Corporation of Conroe, Texas provides water to an area called Spring Forest.
5. Another area north of the site, Imperial Oaks, in Montgomery County north of Rayford Road, is supplied with public ground water.
6. The residential subdivision of Fox Run, northeast of the site in Montgomery County, is supplied with ground water from a public well.
7. Residences on Riley Fuzzel Road east of Spring Creek use private water wells.
8. Residences located on Interstate 45 between Spring Stuebner and Spring Creek have private wells supplying drinking water.
9. The creek north of the site was built to provide flood control for the North Gate Crossing Residential Development.

Guevara

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 9

RECORD OF COMMUNICATION (713) 367-9419	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Gil Hitchcock A-1 Utility Construction Services, Inc. Conroe, Texas	From: Jairo Guevara FIT Chemical Engineer	Date: 4/12/90 Time: 11:30 a.m.

SUBJECT: Community Well at Lesa and Jean in Spring, Texas

SUMMARY OF COMMUNICATION

Mr. Hitchcock stated that:

1. The community well located at Lesa and Jean is owned by William K. Bates, Telephone (713) 353-2900 and 353-3519. He lives one block south of the well.
2. The well is 390 feet deep.
3. The well supplies water to 15 homes in the area.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 10

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call __Discussion _x_Field Trip __Conference __Other(Specify)	
To: Julian Davis Residence Owner (718) 288-3078	From: Jairo Guevara FIT Chemical Engineer	Date: 4/10/90 Time: 6:00 p.m.

SUBJECT: Residential Wells

SUMMARY OF COMMUNICATION

Mr. Davis stated that he operates a private well to supply drinking water to his house and the next house, owned by his aunt. The well is 140 feet deep.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 11

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call __Discussion x Field Trip __Conference __Other(Specify)	
To: Pamela Cadenhead Manager, YMCA Pine Tree Camp (713) 353-4746	From: Jairo Guevara FIT Chemical Engineer	Date: 4/11/90 Time: 11:00 a.m.

SUBJECT: Residential Wells

SUMMARY OF COMMUNICATION

Mrs. Cadenhead stated that:

1. The front house at the Camp is supplied with city water from Bayer Lumber Company.
2. The source of drinking water for the camp is from a private well 150 feet deep.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FLPM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 12

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call __Discussion _x_ Field Trip __Conference __Other(Specify)	
To: Mrs. Terry Residential Well Owner (713) 367-2879	From: Jairo Guevara FIT Chemical Engineer	Date: 4/11/90 Time: 10:00 a.m.

SUBJECT: Residential Wells

SUMMARY OF COMMUNICATION

Mrs. Terry stated that the area is supplied with private wells. Her well is 210 feet deep and was built in 1983. She lives in Spring Hill, Section 2.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA EQ Form 5300-3 which may be used until Supply is Exhausted.

Reference 13

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call x Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Debbie Vaughn Wright EPA Superfund Region VI (213) 655-6740	From: Cairo Guevara FIT Chemical Engineer	Date: 5/4/90 Time:

SUBJECT: Bull Oil and Chemical Transporters, Inc.

SUMMARY OF COMMUNICATION

The site reconnaissance inspection was discussed with Debbie Vaughn-Wright on April 18, 1990. The TAT has practically finished with Phase I of the remedial clean-up action of the site and is planning to start Phase II, which eventually will include removal of on-site and off-site contaminated soil and remediation of the low ponded area. Therefore, no surface or soil sampling is planned. The TAT is also planning to sample the three site monitoring wells. At this point, only residential wells will be sampled by the FIT. Debbie agreed on May 4, 1990 to sample three residential wells near the site: two located south of the site and the third one north of it.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

REFERENCE 14

QUALITY ASSURANCE PROJECT PLAN

FOR FIT ACTIVITIES

TDD F06-8911-32

February 16, 1990

John R. Totin — 2/15/90
John Totin
E & E AFITOM
Date

K. W. Malone — 2/15/90
K. W. Malone, Jr.
E & E FITOM
Date

Ed Sierra — 05/08/90
Ed Sierra
EPA Region VI RPO
Date

REFERENCE 15

ecology and environment, inc.
1509 MAIN STREET, DALLAS, TEXAS 75201, TEL. 214-742-6601
International Specialists in the Environment

MEMORANDUM

TO: Ed Sierra, Region VI RPO

THRU: K. H. Malone, Jr., FITOM

FROM: Jairo Guevara, FIT Chemical Engineer

DATE: May 21, 1990

TDD: F06-9003-11
PAN: FTX0114SAF

SUBJECT: Screening Site Inspection Work Plan
Bull Oil and Chemical Transporters, Inc.
Spring, Harris County, TX
TXD092488741

Attached is the Screening Site Inspection Work Plan for Bull Oil and Chemical Transporters, Inc.

Only residential wells will be sampled during this inspection due to an ongoing emergency remedial investigation by the EPA Emergency Response Branch (ERB) Technical Assistance Team (TAT). After the TAT completes the remedial clean-up, the FIT will re-evaluate the site to determine if any additional sampling is necessary.

SCREENING SITE INSPECTION WORK PLAN

of

BULL OIL AND CHEMICAL TRANSPORTERS, INC.

(TXD092488741)

Prepared By

Jairo Guevara, FIT Chemical Engineer

Ecology and Environment, Inc.
Region VI

May 21, 1990

SCREENING SITE INSPECTION WORK PLAN

OF

BULL OIL AND CHEMICAL TRANSPORTERS, INC.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The Ecology and Environment, Inc. (E & E) Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA) under Technical Directive Document (TDD) F-06-9003-11 to conduct the Screening Site Inspection (SSI) of the Bull Oil and Chemical Transporters, Inc. (TXD092488741) in Spring, Harris County, Texas.

1.1 SCREENING SITE INSPECTION OBJECTIVES

The SSI evaluates the potential risks associated with hazardous waste generation, storage and disposal at the site. It expands upon data collected during the Preliminary Assessment (PA) and identifies data gaps. Information obtained during the SSI supports the management decision of whether the site proceeds to the Listing Site Inspection (LSI) or receives the classification of No Further Action under the Superfund Amendments and Reauthorization Act (SARA).

1.2 SITE DESCRIPTION

Bull Chemical is an inactive chemical business. It bought a wide assortment, in bulk or drums, of off-spec products (still bottoms, spent ethylene glycols, fatty alcohols, solvents, bases, acids), contaminated products and manufacturers overstock, from chemical companies such as Olin Corporation, ARCO and Exxon. The products were stored on site, repacked in drums and sold to private parties and third world countries (1; 2; 3).

The site (Figures 1 and 2) is located at 28538 North East Hardy Street (approximately 1.3 miles north of Highway 2920, or Spring Cypress Road), Spring, Harris County, Texas. The geographic coordinates are 30°06'13" north latitude and 95°25'22" west longitude. The site encompasses approximately one acre and is located in a ten acre lot owned until 1988 by the site operator, Mr. Charles Duesing. Mr. Duesing died in 1988 and his widow took over the responsibility of the site (1).

The facility is located in a rural, sparsely populated area. East Hardy Street, on which the site is located, is not heavily traveled. A bridge over the North Gate Crossing Development Flood Control Creek, north of the site, is under construction. The completion of the bridge and improvements to East Hardy Street north of the creek may increase the traffic at the site. When the site was in operation (1981 to 1988), it was fenced only at the south and west sides. During the remedial action, a fence was installed at the north and east sides (1).

Bull Oil was previously operated at Tomball, Texas (Sycamore and East Main Street). Several citizens' complaints of foul odors and poor operation were investigated by the Harris County Pollution Control Department (HCPCD). The City of Tomball ordered Mr. Duesing to remove all debris, trash, barrels and tank trailers from the site. Mr. Duesing responded by moving his business to Spring in 1981 (1; 4).

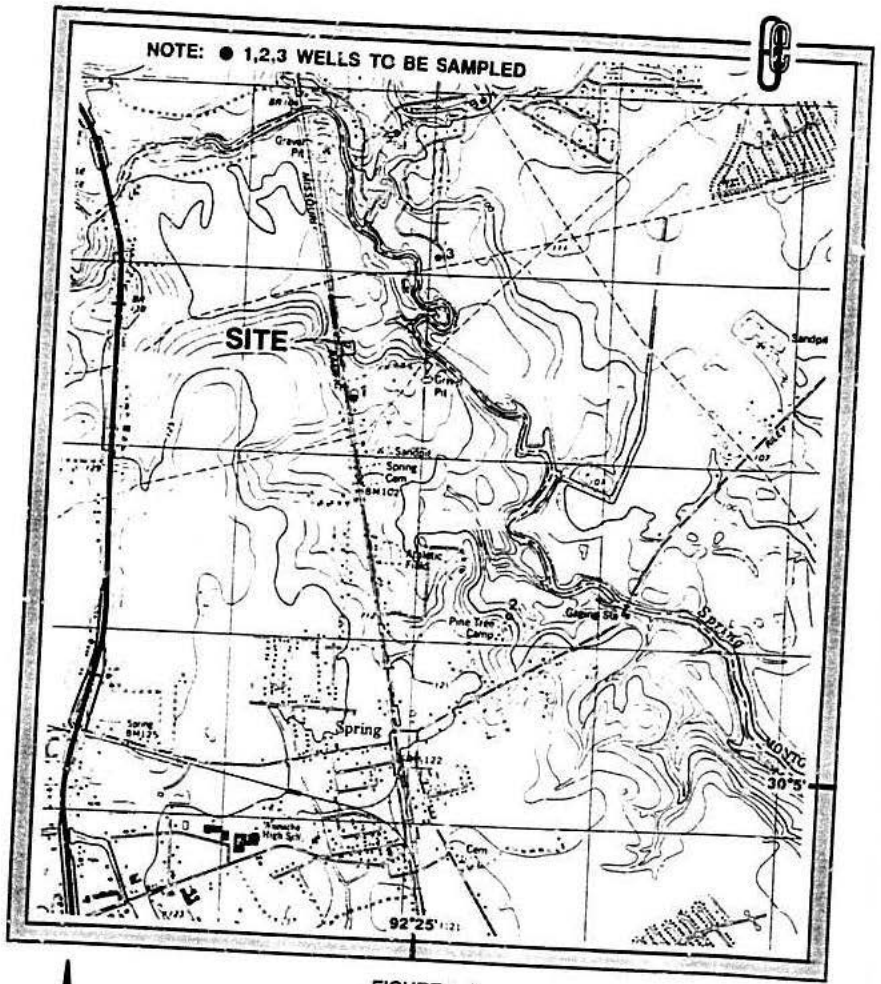


FIGURE 1
SITE LOCATION MAP
WITH RESIDENTIAL WELLS TO BE SAMPLED
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

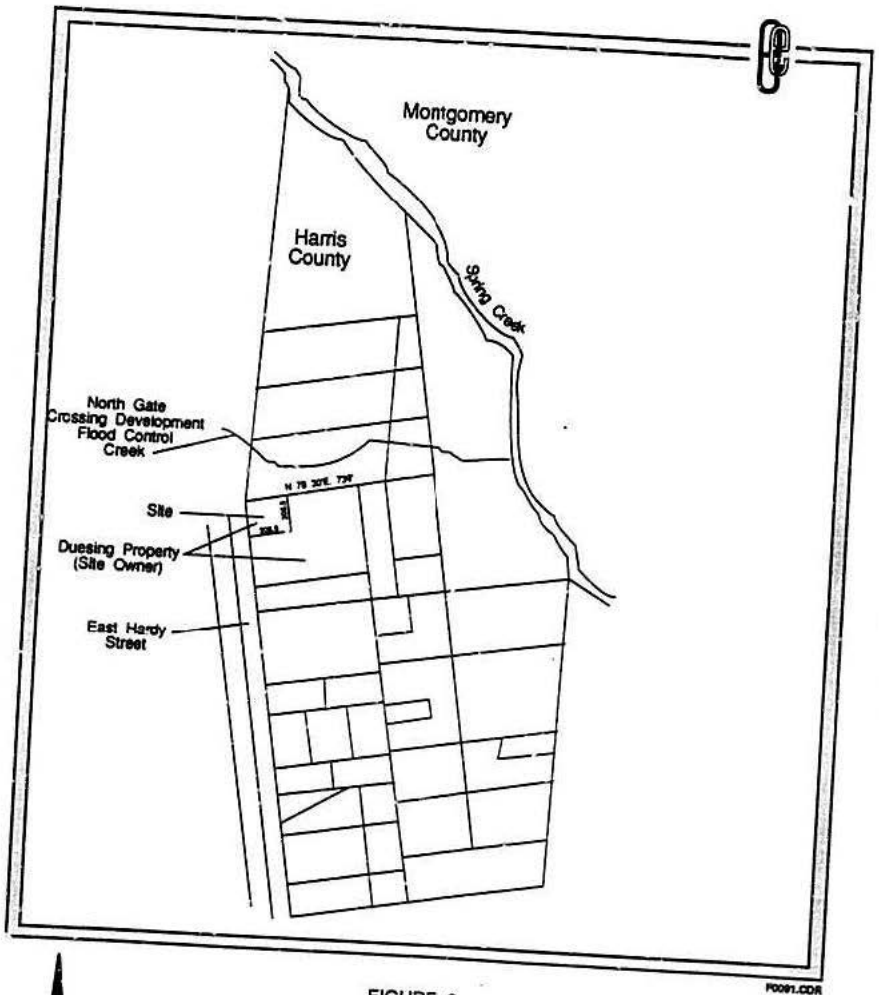


FIGURE 2
LEGAL SITE PLAT
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

The site's location in Spring has been the subject of investigations by the HCPCD, EPA, Texas Water Commission (TWC) and Texas Air Control Board (TACB). In 1988, the HCPC requested EPA Emergency Response Branch (ERB) assistance to assess the imminent hazards. The main problems were spills and careless operation. The Technical Assistance Team (TAT) conducted a site assessment in June 1988. The ERB decided to remove the wastes (bulk tanks and drums) from the site based on the assessment and on a later midnight dumping incident at the site's main gate. The removal, with the exception of two drums, was completed in February 1990. The drums will be removed as soon as negotiations with the responsible party are completed (Photographs 1 through 8) (1; 2: 5).

2. NON-SAMPLING DATA

Source waste characteristics, and the ground water, surface water, soil exposure and air pathways are described below.

2.1 SOURCE WASTE CHARACTERISTICS

The principal waste sources at the site (removed by the TAT) were approximately 1,000 drums with various chemicals, and 17 to 18 bulk storage tanks. A low ponded area located at the northeast corner of the site (currently outside the site fenced area) is the major existing waste source (Photograph 15). Some of the wastes detected on-site and off-site were 1,1,1-trichloroethane, trichloroethene, acetone, chloroform, formaldehyde, chromium, lead, nickel and copper (Figure 3) (1; 3).

2.2 GROUND WATER PATHWAY

The Chicot Aquifer supplies ground water for the site area. It is composed of clay and sand beds that are not persistent in lithology or thickness. The ground water direction at the site area is apparently northeast toward Spring Creek. There is no immediate population northeast of the site (west of Spring Creek). The area drinking water is supplied by public and private ground water wells (5; 6; 7).

The Bayer Lumber Company is the largest public water supplier of Spring. Bayer provides water to the town from two wells. One well is 195 feet deep (screen depth unknown) and the second is 538 feet deep (first screens located between 290 and 310 feet). The wells are located 1.5 miles south of the site and serve 284 homes. A well owned by Mr. William K. Bates and operated by A-1 Utility Construction Services, Inc. of Conroe, Texas supplies water to 15 homes. The well is 390 feet deep and is located 3/4 miles south of the site. A third community well south of the site supplies water to the Lexington Woods Subdivision. The well is located approximately 2.3 miles from the site (Figure 4) (8; 9).

There are several public water supply companies north of the site in Montgomery County. Consumer Water Corporation of Conroe distributes water to Spring Forest, approximately one mile northeast of the site. The Imperial Oaks residential subdivision, approximately 1.5 miles north

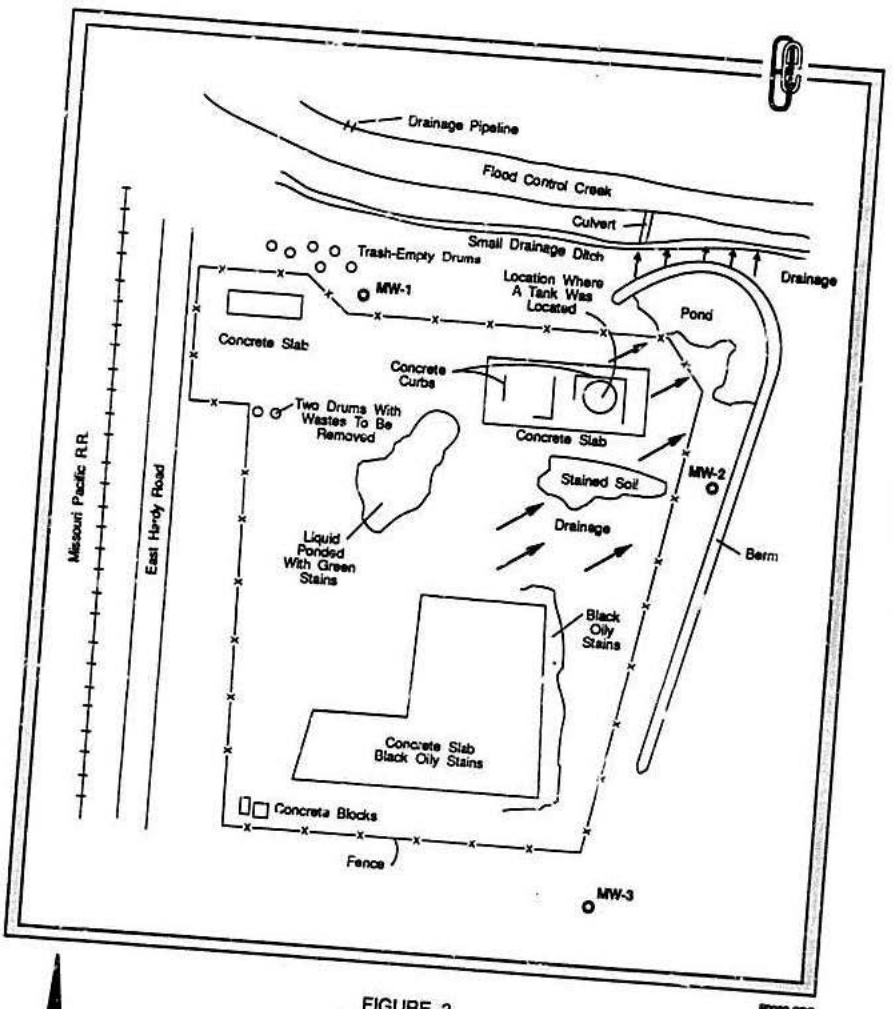


FIGURE 3
SITE SKETCH
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

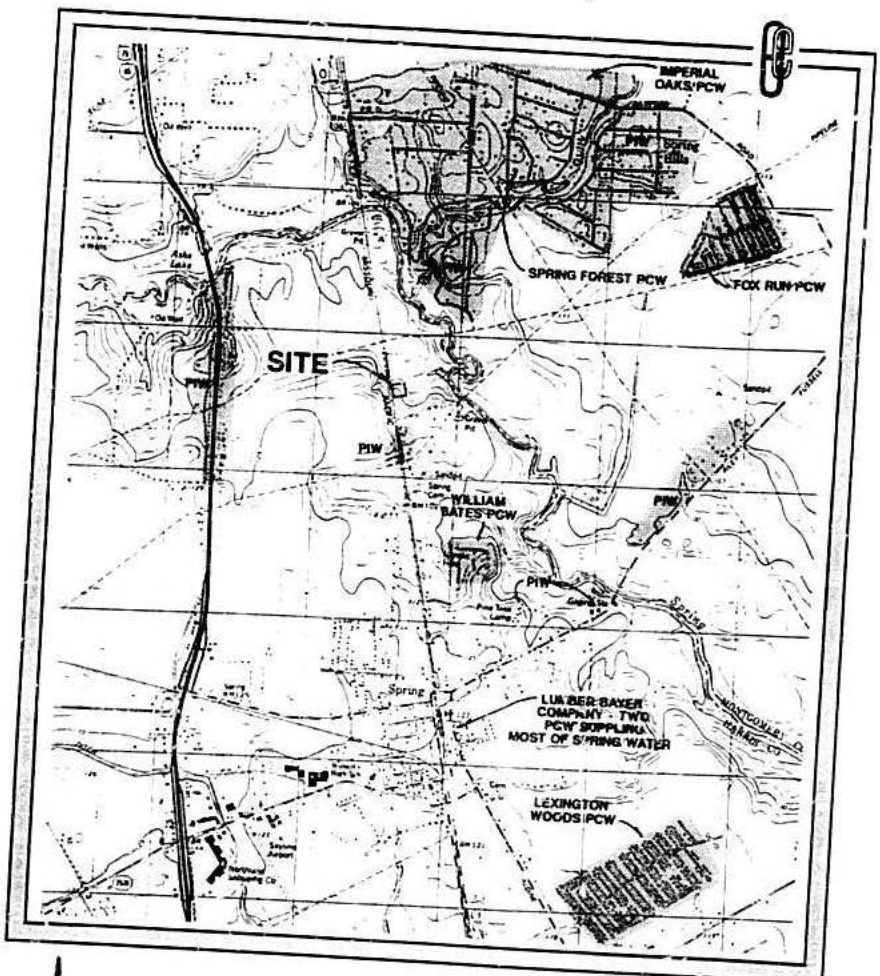


FIGURE 4
PUBLIC SUPPLY AND PRIVATE GROUND WATER WELL LOCATIONS
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

of the site, and the Fox Run residential subdivision, approximately 1.3 miles northeast of the site, also receive public supply water (Figure 4) (8).

Areas which are not supplied by public water systems have 140 to 300 foot deep individual private wells. The closest well (140 feet deep) is the Julian Davis residence, 0.2 miles south of the site. Three additional private wells are located south of the site on East Hardy Street. Private wells are also located on Riley Fuzzell Road. The closest private well (150 feet deep) to the site on Riley Fuzzell Road is owned by the YMCA Pine Tree Camp, approximately 1.2 miles south of the site. Two more private wells are located on Riley Fuzzell Road, west of Spring Creek. Homes east of Spring Creek on this road are also supplied by private water wells. The Spring Hill area, Sections 1, 2 and 3 north of the site, across Spring Creek and in Montgomery County, use drinking water from private water wells. The closest well to the site in this area is approximately 0.5 miles. Residences located on Interstate 45, between Spring Stuebner Road and Spring Creek, also receive water supply from private wells (Figure 4) (7; 8; 10; 11; 12).

Three monitoring wells, 15 to 18 feet deep, located in the north and east sides of the site, were installed by the TAT in February 1990. The TAT will sample these non-secured wells (Figure 3) (Photographs 12, 16 and 17).

2.3 SURFACE WATER PATHWAY

The drainage from the site travels north into a small drainage ditch (100 feet north of the site), then is piped into a creek (200 feet north of the site) which is part of the North Gate Crossing Development Flood Control. The creek discharges into Spring Creek (0.2 miles east), which is a tributary of Lake Houston, a major surface water supply for Houston and nearby communities (Figure 3) (1; 8).

To retain liquid which drained from the site, the site owner built a dike in the north and east sides of a low area in the northeast corner. Ponded liquid is present at this location. A natural drop of elevation occurs between the pond and the small drainage north of the site. The natural levees are eroded in several locations where drainage has flowed (Figure 3) (Photographs 9, 10 and 13) (5).

2.4 SOIL EXPOSURE PATHWAY

The soil at the site appears to be contaminated with oily black and green stains (Photographs 1 through 8). TAT is planning to further characterize the soil on-site, and to remove the contaminated soil on and off-site, replacing it with clean soil. The TAT conducted an off-site soil sampling around the perimeter of the site and at the flood control creek. A soil gas survey was also conducted on and off-site. The most contaminated soil appears to be at the low ponded area. The TAT plans to evacuate the liquid from this area, remove the contaminated soil and fill the low area with clean soil (1; 5).

2.5 AIR PATHWAY

The TAT recorded readings from the HNu of up to 6 ppm when the wastes were present on-site. An off-site air sampling inspection was conducted by the TAT prior to waste removal. No volatile emission was detected during the sampling (1).

No particulates were generated during the site operation because the wastes handled were liquids. No dust is believed to be dispersed from the site, which has numerous concrete slabs. During the FIT reconnaissance inspection, no readings were detected with an HNu (Figure 3) (5; 7).

3. SAMPLING DATA

The existing analytical and sampling methodology are described below.

3.1 EXISTING ANALYTICAL DATA

The TAT sampled the site in August 1988 and in January-February 1990. During the August 1988 off-site sampling inspection, three water, eight soil/sediment and seven air samples were collected. The water and soil/sediment samples were analyzed for inorganics (metals) and organics (volatiles - VOAs, Acid/Base/Neutral - ABNs and pesticides/PCBs). Hardness, alkalinity and cyanides were also analyzed in the water samples. Cyanides, reactivity and EP toxicity were analyzed in the soil/sediment samples. The air samples were analyzed for acrylonitrile, benzene, chloroform, carbon tetrachloride, 1,2-dichloroethane and 1,2-dichloropropane.

The inorganics detected in the water and soil/sediment samples were calcium, chromium, copper, barium, iron, lead, manganese, mercury, nickel, potassium, vanadium and zinc. These inorganics were detected at concentrations 1.25 to 6.75 times higher than the background samples. Background levels of chromium and lead were high. The highest inorganic concentrations were detected at the low ponded area (1).

The organics described in the water and soil/sediment samples were 1,1,1-trichloroethane, tricloroethene, acetone and unknown hydrocarbons. The organic compounds were detected in the low ponded area. The concentration of the first two compounds was very high (1,060 and 3,710 ppm respectively). No compounds were detected in the air samples (1).

During January and February 1990, an off-site soil sampling was conducted at the perimeter of the site. Results of the sampling analyses are not known. A soil gas survey on and off-site was conducted with a Photovac unit at that time. The survey indicated that the most contaminated area is the off-site pond at the northeast corner of the site (5).

3.2 SAMPLING METHODOLGGY

No surface water or soil/sediment sampling will be conducted by the FIT at this time, since the TAT is ready to start Phase II, which will include additional sampling and removal of contaminated soil on and off-site. The TAT is also planning to sample the three monitoring wells installed around the site. Therefore, the FIT sampling at this point will be limited to residential wells (Figure 1). As discussed with EPA Project Officer Debbie Vaughn-Wright, the following three residential wells will be sampled (13):

- Julian Davis Residence. This well (140 feet) will be sampled because it is the closest well to the site and is relatively shallow. It will also supply water to a second residence.
- YMCA Pine Tree Camp. This well supplies water to a children's camp. It is relatively shallow (150 feet), near the site and located in the direction of a residential area.
- Mrs. Terry's Residence. This well is relatively shallow, located only 0.5 miles north of the site, in an area of a residential zone.

The purpose in sampling these wells is to determine if any residential ground water is contaminated. No immediate residential wells were located in the direction of the ground water flow (northeast). An indication of any contamination in this direction will be determined when the TAT samples the three downgradient site monitoring wells.

The well grab samples are considered low concentration and will be analyzed for organics (volatiles - VOAs, Acid/Base/Neutral - ABNs and pesticides/PCBs) and inorganics (metals and cyanides) under Routine Analytical Services (RAS). The samples will also be analyzed for conductivity, hardness and alkalinity.

The samples will be collected according to the Ecology and Environment FIT Quality Assurance Project Plan (QAPP). A matrix spike/matrix spike duplicate, field collocated duplicate, trip blank and equipment rinsate will be collected according to the QAPP (14).

4. PROJECT MANAGEMENT

Key personnel, level of effort and community relations are described below.

4.1 KEY PERSONNEL

Two team members will sample the three monitoring wells. The project manager is Jairo Guevara. The other team member will assume the duties and responsibilities of the Site Safety Officer.

4.2 LEVEL OF EFFORT AND SCHEDULE

The level of effort required for the SSI is listed in Table 1.

4.3 COMMUNITY RELATIONS

Persons requesting site information will be instructed to submit a Freedom of Information Act Request to: Freedom of Information Officer, U.S. EPA Region VI, 1445 Ross Avenue, Dallas, Texas 75202-2733. Reporters will be instructed to contact the Office of External Affairs at (214) 655-2200.

TABLE 1

SSI LEVEL OF EFFORT

TASK	LOE (HOURS)
Revision of Files	34
Safety Plan (Reconnaissance Inspection)	24
Reconnaissance Inspection and Preparation	38
Work Plan	60
Safety Plan (Sampling Inspection)	16
Sampling, Planning and Preparation	16
Sampling Travel	24
Sampling	16
QA/QC of Sampling Data	40
Additional Sampling (if necessary)	48
Additional Travel (if necessary)	32
Additional QA/QC of Data (if necessary)	40
Revision of Future TAT Activities	80
PreScore	40
Report Preparation	80
Plus 10 percent	588
Total	58
	64F

Samples Required: 5 low water.

REFERENCES

1 Site Assessment of Bull Oil and Chemical Transporters, Inc., Spring, Texas. Prepared by Ecology and Environment, Inc. TAT for EPA Region VI Emergency Response Branch. October 20, 1988.

2 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Jim Mullins, Emergency Response Branch Supervisor, EPA Region VI. April 19, 1990. TXD092488741.

3 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Bob Allen, Harris County Pollution Control Department. To: David Gonzalez, Superfund EPA Region VI. June 23, 1988. TXD092488741.

4 Memorandum. Bull Oil and Chemical Transporters, Inc. From: Clayton Williams, City Administrator, City of Tomball. To: Charles H. Duesing, Site Owner. December 19, 1980.

5 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: John Hogue and Tom Spargo, TAT Houston Office. April 10, 1990. TXD092488741.

6 Development of Ground Water in the Houston District, Texas, 1966-1969. Report 152. Texas Water Development Board. June 1972. Second Printing, January 1973.

7 Record of Communication. Bull Oil and Chemical Transporters FIT Reconnaissance Inspection. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Bull Oil and Chemical Transporters File. April 10-11, 1990. TXD092488741.

8 Record of Communication. Spring, Texas Water Supply. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Arthur Bayer, Owner of Bayer Lumber Company. April 10, 1990. TXD092488741.

9 Record of Communication. Community Well at Lesa and Jean, Spring, Texas. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Gil Hitchcock, A-1 Utility Constuction Services, Inc., Conroe, Texas. April 12, 1990. TXD092488741.

10 Record of Communication. Residential Wells. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Julian Davis, Residential Well Owner. April 10, 1990. TXD092488741.

REFERENCES

11 Record of Communication. Residential Wells. Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Pamela Cadenhead, YMCA Pine Tree Camp Manager. April 11, 1990. TXD092488741.

12 Record of Communication. Residential Wells. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Mrs. Terry, Residential Owner. April 11, 1990. TXD092488741.

13 Record of Communication. Bull Oil and Chemical Transporters, Inc. From: Jairo Guevara, FIT Chemical Engineer, Ecology and Environment, Inc. To: Debbie Vaughn-Wright, Superfund EPA Region VI. May 4, 1990. TXD092488741.

14 Quality Assurance Project Plan for FIT Activities. Prepared by Ecology and Environment, Inc. for EPA Region VI. February 16, 1990.

Photo No. 1

Site Name

Location

CERCLIS #

Photographer/Witness

Date Time Direction

Photo No. 2

Photographer/Witness

Date Time Direction

Page 1

Of 1

Photo No. 3

Site Name:

Location:

CERCLIS #

Photographer/Witness [illegible] Diana Stone

Date 11/14 Time 4:10 p.m. Direction W

[illegible]

Photo No. 4

Page 2

Of 2

Photographer/Witness [illegible] Diana Stone

Date 11/14/90 Time [illegible] Direction W

[illegible]

0-7-1-9

Photo No. 5

Site Name:

Location:

CERCLIS #

Photographer/Witness [illegible] Sloan

Date 4/18/96 Time [illegible] Direction N

Description of Photo: [illegible] of the [illegible] of the site

Photo No. 6

Page 3

Of 10

Photographer/Witness [illegible] Sloan

Date 4/18/96 Time [illegible] Direction N

Description of Photo: [illegible] of the site

Photo No.
1

Site Name:

Location:

CERCLIS #

Photographer/Witness

Date Time Direction

Photo No.
2

Page 1

Of

Photographer/Witness

Date Time Direction

Photo No. 9

Site Name:

Location:

CERCLIS #:

Photographer/Witness [illegible] Brian M Stone
Date 4-6-92 Time 2:15 p.m. Direction W
Description Front gate entrance to site.

Photo No. 10

Photographer/Witness [illegible] Brian M Stone
Date 4-6-92 Time 2:25 Direction S
Description Taken from the front gate looking
S-SE along the road. Fencing and gate on the
left of the photo. Notice erosion gullies that

Page 5
Of 16

Photo No. 1

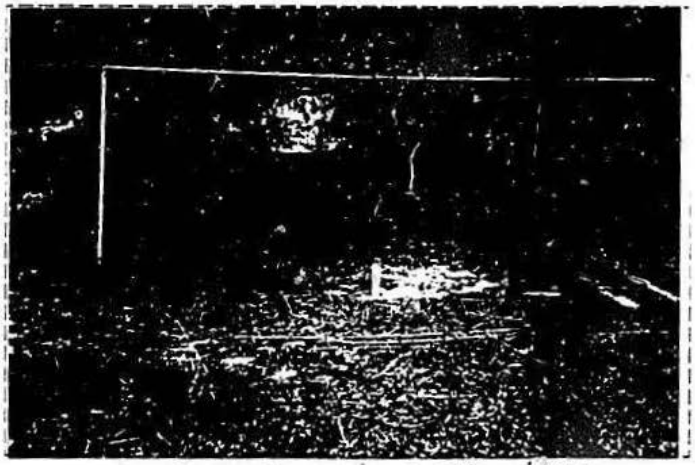
Photographer/Witness [illegible]
Date 4/19/ Time 5:00 p.m. Direction NW
Description [illegible]

Site Name:

Location:

CERCLIS #:

Photo No. 2



Photographer/Witness [illegible]
Date 4/19/ Time 5:02 p.m. Direction S
Description N monitoring well in front of [illegible]

Page 6
Of 12

0 7 0 9

Photo No. 3

Site Name:

Location:

CERCLIS #:

Photographer/Witness [illegible] Shaw
Date 4/16/96 Time 5:31 pm Direction E
Description Flow from culvert 20' north toward spring creek

Photo No. 4

Photographer/Witness [illegible] Shaw
Date 4/16/96 Time 5:40 pm Direction S
Description Close up of culvert where it enters the ground. Note the accumulation of debris and drum.

Page 7
Of 10

0 7 2 4

Photo No. 15

Site Name:

Location:

Hazard St. W.

CERCLIS #:

Photographer/Witness [illegible]

Date 4/12/02 Time [illegible] Direction N/E

Description NE facing pond

Photo No. 16

Photographer/Witness [illegible]

Date 4/12/02 Time [illegible] Direction E

Description [illegible]

Page 4

Of 13

0 7 0 5 2 0

Photo No. 17

Site Name [illegible]

Location [illegible]

CERCLIS # [illegible]

Photographer/Witness [illegible] Shawn Stone

Date 4/10/90 Time 5 [illegible] Direction S

Description SE monitoring well

Page 9

Of 13

REFERENCE 16

DRAFT

TOTAL METALS ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING OF 2/17 TO 2/19/90
SOIL SAMPLES: UG/KG
WATER SAMPLES UG/L

SAMPLE ID METALS	M-2	M-3	S9	S14 BACKGROUND SAMPLE
Aluminum	3582	1618	8427	2431
Antimony	--	--	[illegible]	--
Arsenic	254	--	3.[illegible]1	1.32
Barium	83.9	94.7	98.87	27.26
Beryllium	--	--	0	--
Cadmium	--	--	2.09	--
Calcium	27070	20370	8500	--
Chromium	174.3	--	16.68	368
Cobalt	--	--	4.34	5.18
Copper	--	44.5	7.94	--
Iron	4957	1849	7895	--
Lead	15.4	--	10.18	2817
Magnesium	4921	2476	772	9.75
Manganese	262.3	108	90.35	168
Mercury	1.2	--	0	138
Nickel	--	--	9.01	--
Potassium	8978	5496	558	--
Selenium	--	--	C	92.7
Silver	--	--	0	--
Sodium	119800	25780	148	--
Thallium	--	--	C	46.7
Vanadium	--	--	21.09	--
Zinc	240.5	25.2	43.3	9.59 5.73

VOLATILE ORGANICS ANALYSIS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING OF 2/17 TO 2/19/90
WATER SAMPLES: UG/L

SAMPLE ID VOLATILE COMPOUNDS	W1	W2	W3	W4 BACKGROUND	W5 RINSATE BLANK	W6 TRIP BLANK
Methylene Chloride	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,1 - dichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Trans-1,2-dichloroethene	20	Undetected	Undetected	Undetected	Undetected	Undetected
Chloroform	Undetected	94	Undetected	Undetected	Undetected	Undetected
1,2-dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,1,1-trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Carbon tetrachloride	Undetected	110	Undetected	Undetected	Undetected	Undetected
1,2-dichloropropane	Undetected	37	Undetected	Undetected	Undetected	Undetected
Cis-1,3-dichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Trichloroethene	Undetected	15	Undetected	Undetected	Undetected	Undetected
1,1,2-trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Benzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Tetrachloroethene	Undetected	13	Undetected	Undetected	Undetected	Undetected
1,1,2,2-tetrachloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Toluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Chlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Ethylbenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Styrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Total xylenes	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Tetrahydrofuran (THF)	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Total hydrocarbons	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected

VOLATILE ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING 2/17 TO 2/19/90
SOIL SAMPLES IN UG/KG

SAMPLE ID	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Methylene Chloride	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	33	NO SAMPLES	Undetected	Undetected
1,1-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
1,1-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
Trans- 1,2-Dichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	31	Undetected
Chloroform	Undetected	Undetected	Undetected	120	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
1,2-Dichloroethane	Undetected	Undetected	Undetected	1200	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
1,1,1-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
Carbon tetrachloride	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
1,2-Dichloropropane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	2860	NO SAMPLES	110	Undetected
Cis-1,3-Dichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	240	NO SAMPLES	Undetected	Undetected
Trichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	310	NO SAMPLES	36	Undetected
1,1,2-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
Benzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	34	NO SAMPLES	Undetected	Undetected
Tetrachloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	1100	NO SAMPLES	44	Undetected
1,1,2,2- Tetrachloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
1,3-Transdichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	49	NO SAMPLES	Undetected	Undetected
Toluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	34	NO SAMPLES	Undetected	Undetected
Chlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
Ethylbenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	42	NO SAMPLES	Undetected	Undetected
Styrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	NO SAMPLES	Undetected	Undetected
Total xylenes	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	660	NO SAMPLES	Undetected	Undetected
Tetrahydrofuran	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	46	NO SAMPLES	Undetected	Undetected
Total hydrocarbons, TIC, and unknowns	Undetected	Undetected	Undetected	Undetected	Undetected	89 Undetected	720 (E)	NO SAMPLES	67 (E)	Undetected

VOLATILE ANALYSIS RESULTS
FOR
BULL CHEMICAL SPILL INVESTIGATION
SAMPLING 2/17 TO 2/19/90
SOIL SAMPLES IN UG/KG

SAMPLE ID	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Methylene Chloride	Undetected	Undetected	Undetected	Undetected	140	Undetected	Undetected	Undetected	77	38
1,1-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
1,2-Dichloroethane	Undetected	Undetected	Undetec	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Trans- 1,2-Dichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Chloroform	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	66	Undetecte
1,2-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	930	Undetecte
1,1,1-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Carbon tetrachloride	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
1,2-Dichloropropane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Cis-1,3-Dichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Trichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
1,1,2-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Benzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	540	Undetected	Undetecte
Tetrachloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	92	Undetected	Undetecte
1,1,2,2- Tetrachloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	3700	Undetected	Undetecte
1,3-Transdichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Toluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Chlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Ethylbenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	3400	22	Undetecte
Styrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	1800	Undetected	Undetecte
Total xylenes	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	760	Undetected	Undetecte
Tetrahydrofuran	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte
Total hydrocarbons, TIC, and unknowns	Undetected	26(E)	49 (E)	Undetected	Undetected	Undetected	Undetected	Undetected	63 (E)	110 (E)

VOLATILE ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING 2/17 TO 2/19/90
SOIL SAMPLES IN UG/KG

SAMPLE ID	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Methylene Chloride	Undetected	79	130	Undetected	96	66	140	Undetected	98	Undetected
1,1-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,1-Dichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	65	Undetected	Undetected
Trans- 1,2-Dichloroethene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Chloroform	Undetected	490	Undetected	280	310	63	3300	46	Undetected	Undetected
1,2-Dichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,1,1-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Carbon tetrachloride	Undetected	54	58	2400	84	Undetected	Undetected	Undetected	Undetected	Undetected
1,2-Dichloropropane	Undetected	Undetected	Undetected	120	800	Undetected	Undetected	Undetected	Undetected	Undetected
Cis-1,3-Dichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Trichloroethene	Undetected	Undetected	Undetected	340	35	18	Undetected	Undetected	Undetected	Undetected
1,1,2-Trichloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Benzene	Undetected	Undetected	Undetected	Undetected	71	Undetected	Undetected	Undetected	Undetected	Undetected
Tetrachloroethene	Undetected	110	Undetected	15	1500	Undetected	Undetected	34	Undetected	Undetected
1,1,2,2- Tetrachloroethane	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,3-Transdichloropropene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Toluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Chlorobenzene	Undetected	Undetected	Undetected	Undetected	34	Undetected	Undetected	Undetected	Undetected	Undetected
Ethylbenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Styrene	Undetected	Undetected	Undetected	470	180	Undetected	Undetected	Undetected	Undetected	Undetected
Total xylenes	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Tetrahydrofuran	Undetected	Undetected	Undetected	120 (E)	3200 (E)	Undetected	Undetected	Undetected	Undetected	Undetected
Total hydrocarbons, TIC. and unknowns	19 (E)	Undetected	41 (E)	27 (E)	1251 (E)	59 (E)	Undetected	Undetected	Undetected	Undetected

SEMI-VOLATILES ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING OF 2/16 TO 2/17/90
WATER SAMPLES: UG/L

SAMPLE ID	W1	W2	W3	W4
Phenol	Undetected	103	Undetected	Undetected
2-Chlorophenol	Undetected	Undetected	Undetected	Undetected
1,4-Dichlorophenol	Undetected	Undetected	Undetected	Undetected
Benzyl alcohol	Undetected	Undetected	Undetected	Undetected
2-Methyl phenol	Undetected	Undetected	Undetected	Undetected
4-Methyl phenol	Undetected	Undetected	Undetected	Undetected
Isophorone	Undetected	12C	Undetected	Undetected
N-Nitroso-Di-n-propylamine	Undetected	Undetected	Undetected	Undetected
Benzoic acid	Undetected	Undetected	Undetected	Undetected
Napthalene	Undetected	Undetected	Undetected	Undetected
1,2,4-Trichloro-benzene	Undetected	Undetected	Undetected	Undetected
4-Chloro-3-methyl-phenol	Undetected	Undetected	Undetected	Undetected
Acenapthylene	Undetected	Undetected	Undetected	Undetected
Acenapthene	Undetected	Undetected	Undetected	Undetected
2,4-Dinitrotoluene	Undetected	Undetected	Undetected	Undetected
Fluorene	Undetected	Undetected	Undetected	Undetected
Pentachlorophenol	Undetected	Undetected	Undetected	Undetected
Phenathrene	Undetected	Undetected	Undetected	Undetected
Anthracene	Undetected	Undetected	Undetected	Undetected
Pyrene	Undetected	Undetected	Undetected	Undetected
Chrysene	Undetected	Undetected	Undetected	Undetected
TIC, unknowns, and unknown hydrocarbons	130400(E)	788000(E)	0	11000(E)

SEMI-VOLATILES ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING OF 2/16 TO 2/17/90
SOIL SAMPLES: UG/KG

SAMPLE ID	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	450	No Samples	Undetected	Undetected
2-Chlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
1,4-Dichlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Benzyl alcohol	Undetected	Undetected	Undetect	Undetected	Undetected	Undetected	560	No Samples	Undetected	Undetected
2-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
4-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Isophorone	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
N-Nitroso-Di-n-propylamine	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Benzo(b,k-)fluoranthene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetecte	600
Benzoic acid	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Napthalene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
1,2,4-Trichlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
4-Chloro-3-methyl-phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Acenaphthylene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Acenapthene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
2,4-Dinitrotoluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Fluorene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Pentachlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Phenanthrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Anthracene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Pyrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
Chrysene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	No Samples	Undetected	Undetected
TIC, unknowns, and unknown hydrocarbons	320(a,	270(a)	61(E)	3100(E)	325(E)	1346(E)	16430(E)	No Samples	2125(E)	975(E)

SEMI-VOLATILES ANALYSIS RESULTS
BULL CHEMICAL OIL INVESTIGATION
SAMPLING OF 2/16 TO 2/17/90
SOIL SAMPLES: UG/KG

SAMPLE ID	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2-Chlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,4-Dichlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Benzyl alcohol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
4-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Isophorone	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
N-Nitroso-Di-n-propylamine	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Butyl Benzylphthalate	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	880	Undetected
Benzoic acid	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Napthalene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,2,4-Trichlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
4-Chloro-3-methyl-phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Acenapthylene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Acenapthene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2,4-Dinitrotoluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Fluorene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Pentachlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Phenanthrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Anthracene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Pyrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Chrysene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
TIC, unknowns, and unknown hydrocarbons	527(E)	24(E)	170(E)	150(E)	Undetected	Undetected	1311(E)	1810(E)	1040(E)	1380(E)

SEMI-VOLATILES ANALYSIS RESULTS
FOR
BULL CHEMICAL SOIL INVESTIGATION
SAMPLING OF 2/14 TO 2/17/90
SOIL SAMPLES: UG/KG

SAMPLE ID	S21	S22	S23	S24	S25	S26	S27	S28	S29
Phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2-Chlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,4-Dichlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Benzyl alcohol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
4-Methyl phenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Isophorone	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
N-Nitroso-Di-n-propylamine	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Benzoic acid	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Naphthalene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
1,2,4-Trichlorobenzene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
4-Chloro-3-methylphenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Acenapthylene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Acenapthene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
2,4-Dinitrotoluene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Fluorene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Pentachlorophenol	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Phenanthrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Anthracene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Pyrene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
Chrysene	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected	Undetected
TIC, unknowns, and unknown hydrocarbons	330(E)	11290(E)	Undetected	5960(E)	28000(E)	3400(E)	Undetected	Undetected	Undetected

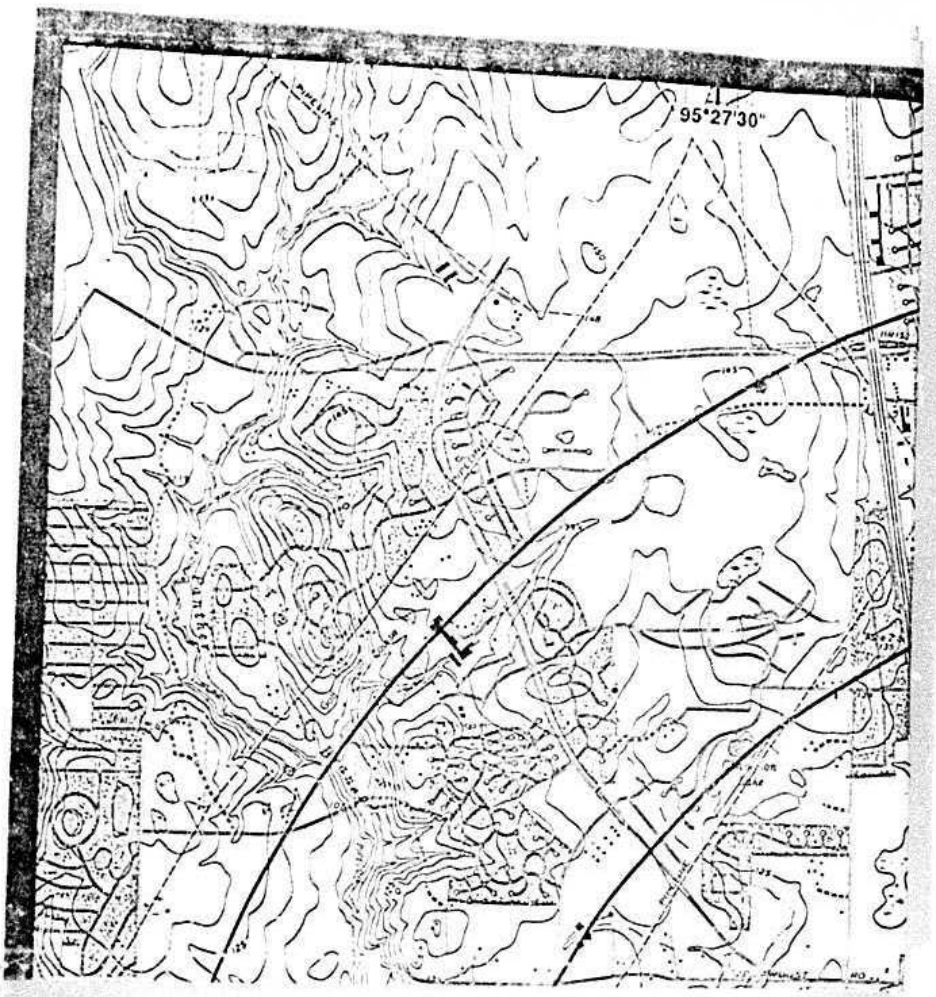
OVERSIZE DOCUMENT

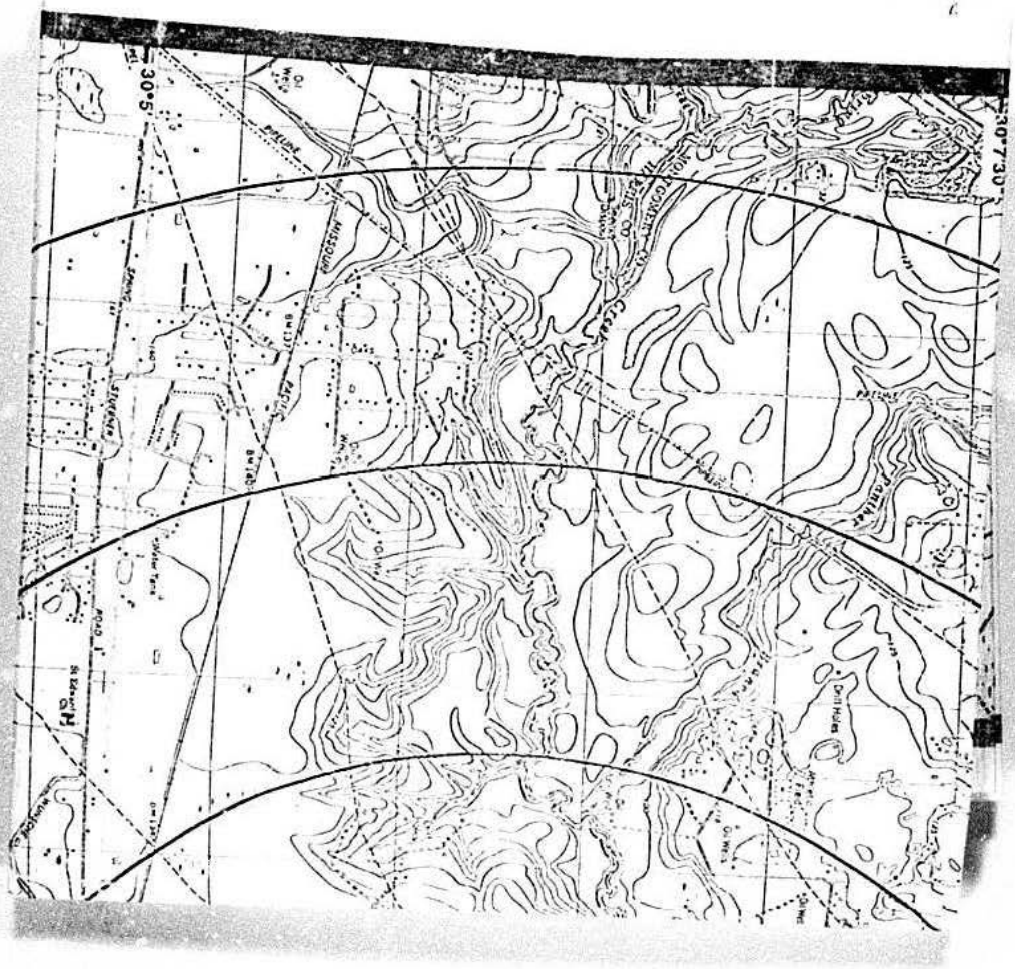
The page that occupies this position in the paper document is:

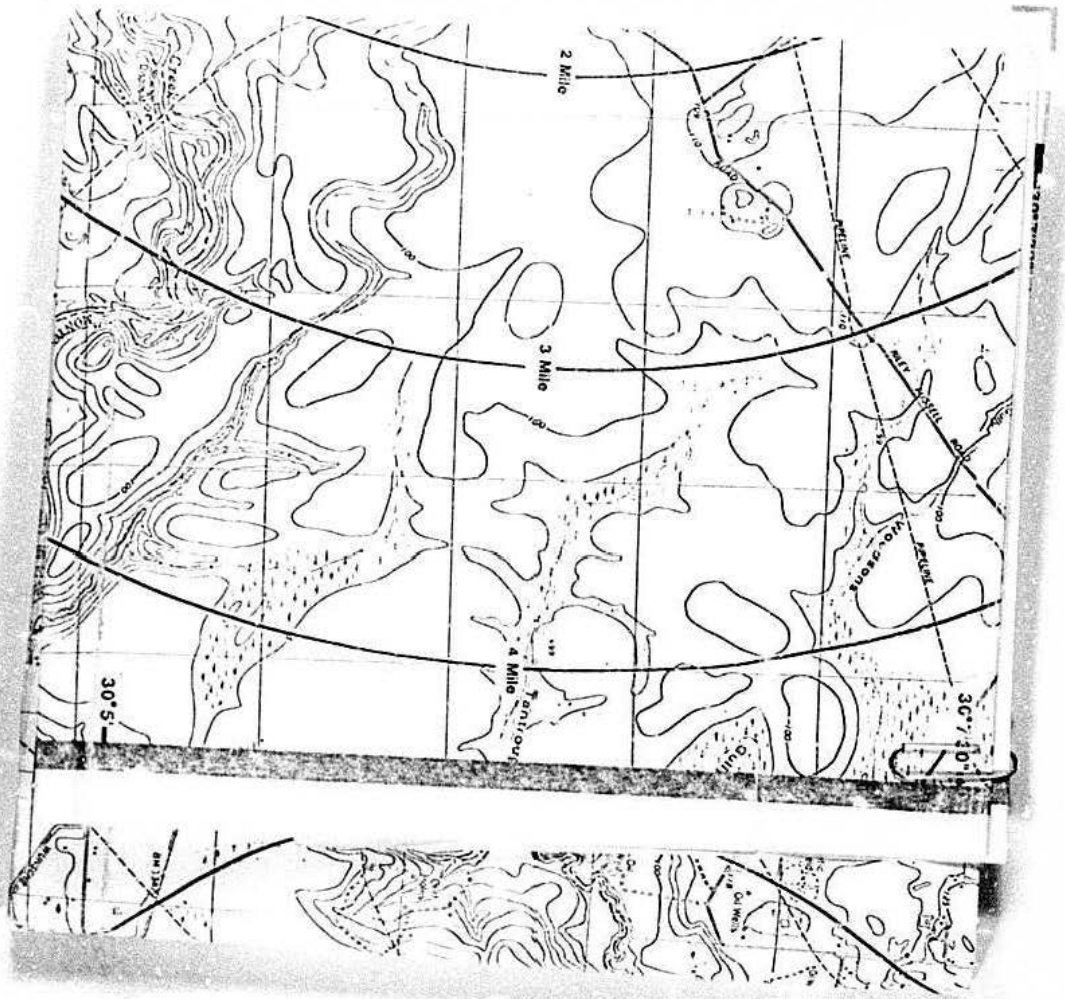
Oversized document number:
IXD092488741
SF SA VOL 02
on the roll of 35mm film.

Titled:

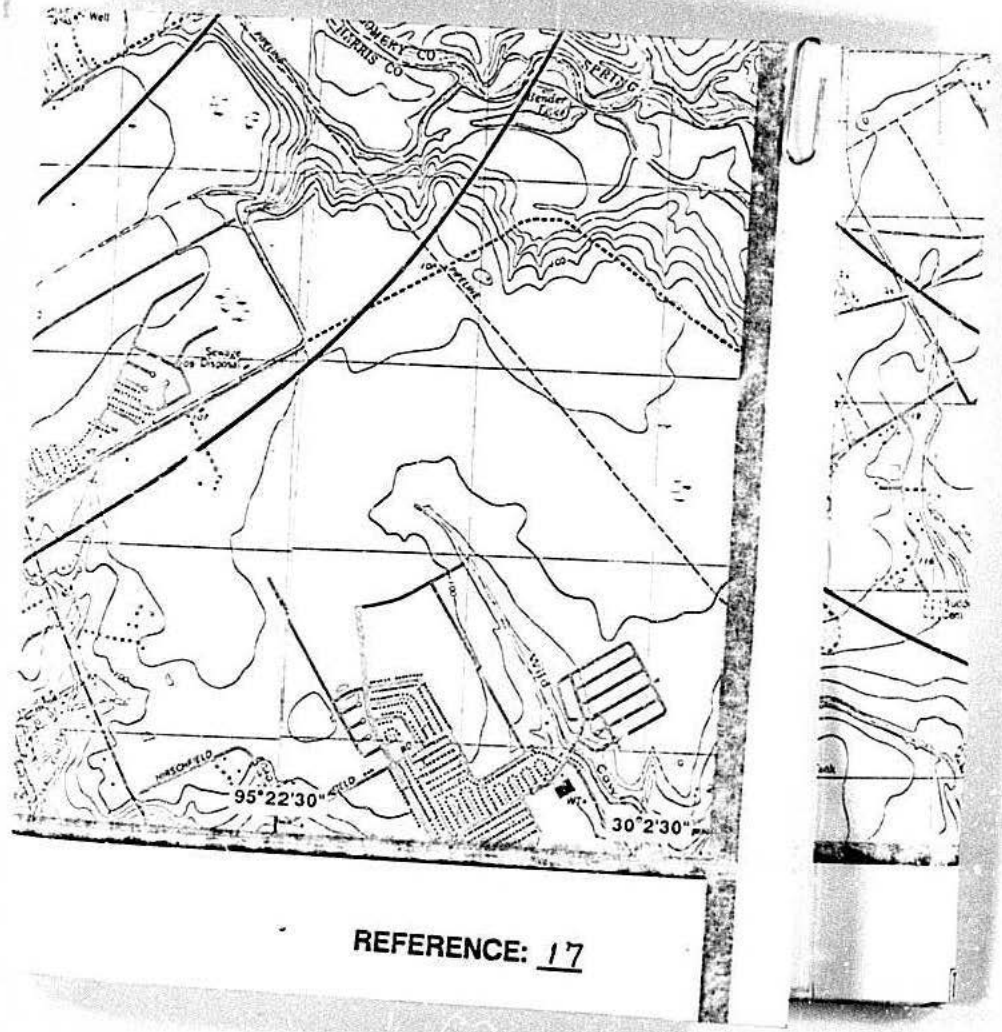
RG-HS-R-TXM001



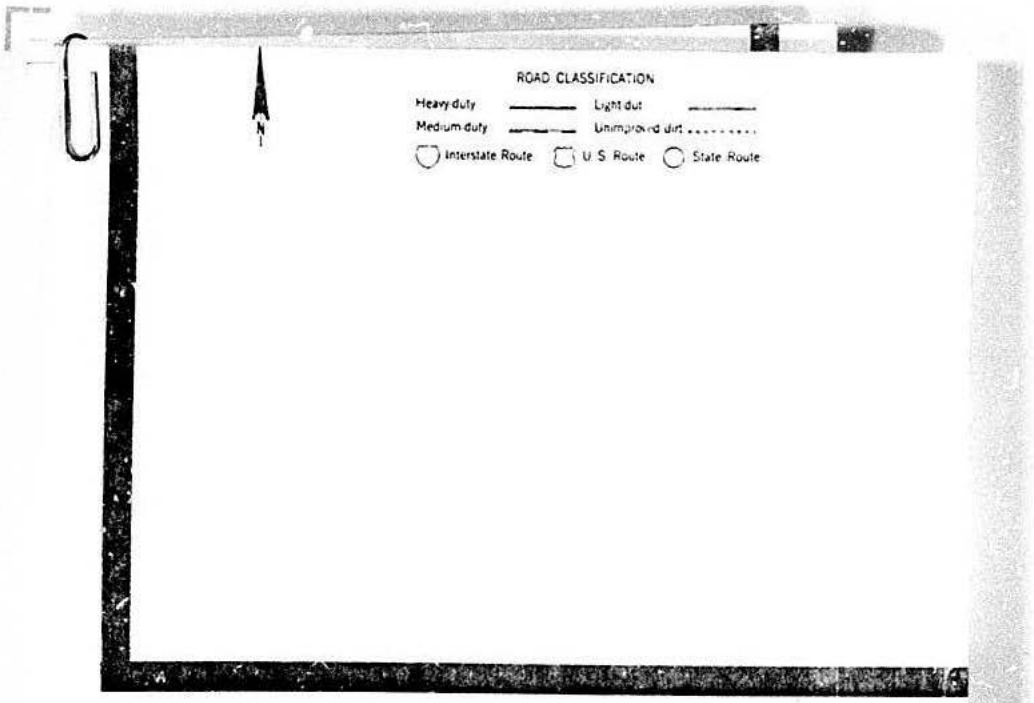




Site Name: Bull Oil And Chemical Transporters, Inc



REFERENCE: 17



ecology & environment, inc.

Location: Spring, Texas
Site ID: TXD092485741

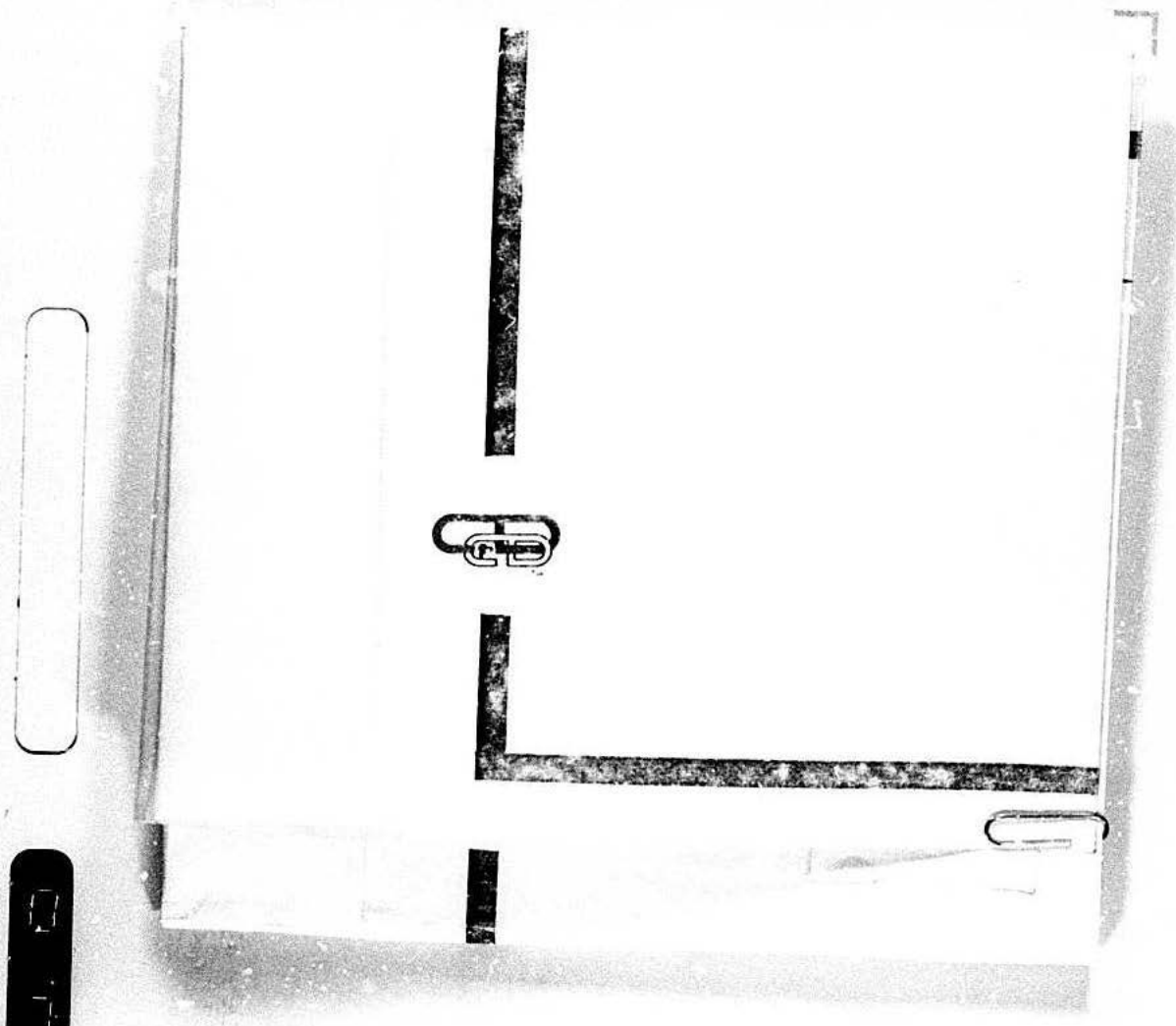
USGS TOPOGRAPHIC MAPS

Name: Tamina, Tx. Date: 1961 Revised: 1979 Contour Interval: 5'	Name: Out Law Pond, Tx. Date: 1959 Revised: 1979 Contour Interval: 5'
Name: Spring, Tx. Date: 1982 Revised: Contour Interval: 5'	Name: Magdan, Tx. Date: 1982 Revised: Contour Interval: 5'

Quadrangle Location

TEXAS

1 1/2 0 1 Mile



REFERENCE 18

TARGET COMPOUND LIST ANALYTE LISTS

Samples for this site were analyzed for the specific Target Compound List (TCL) compounds on the following pages. Data Summary Tables included with this report list only those compounds detected in the samples. If a compound is not listed on the Data Summary Table but is included on the attached lists, it was not detected in the samples. Four different sets of lists may be included, depending of the analytical protocols for the samples. These lists include:

1. Houston EPA Laboratory Drinking Water Sample Analysis
2. CLP Multi-Media, Multi-Concentration Sample Analysis
3. CLP Low Concentration Water Sample Analysis
4. CLP High Concentration Sample Analysis

The lists include the CAS number for each analyte. CLP CRDLs (Contract Required Detection Limits-metals and cyanide) or CRQLs (Contract Required Quantitation Limits-organics) for each analyte are listed for each of the CLP protocols. For samples analyzed by the Houston EPA laboratory, CLP multi-media low concentration water CRDLs or CRQLs and Houston laboratory Detection limits (DL) are listed.

Note that sample specific CRDLs or CRQLs are dependent on sample size, dilution and moisture content (soils). Variations in sample size and sample dilutions are noted in the data evaluation. The moisture content of each soil sample is listed on the data summary sheet.

Descriptions of how to determine CLP medium concentration soil CRQLs are listed at the bottom of the page of the multi-media multi-concentration lists.

HOUSTON DRINKING WATER ABN (SEMI-VOLATILE) ORGANIC ANALYTES

ANALYTE	CAS #	CLP CRQL ug/l (ppb)	HOUSTON DL ug/l (ppb)
PHENOL	108-95-2	0.010	0.004
bis(2-CHLOROETHYL) ETHER	111-44-4	0.010	0.002
2-CHLOROPHENOL	95-57-8	0.010	0.004
1,3-DICHLOROBENZENE	541-73-1	0.010	0.002
1,4-DICHLOROBENZENE	106-46-7	0.010	0.002
BENZYL ALCOHOL	100-51-6	0.010	0.004
1,2-DICHLOROBENZENE	95-50-1	0.010	0.002
2-METHYLPHENOL	95-48-7	0.010	0.006
bis(2-CHLOROISOPROPYL) ETHER	108-60-1	0.010	0.002
4-METHYLPHENOL	106-44-5	0.010	0.006
N-NITROSO-di-n-PROPYLAMINE	621-64-7	0.010	0.006
HEXACHLOROETHANE	67-72-1	0.010	0.002
NITROBENZENE	98-95-3	0.010	0.002
ISOPHORONE	78-59-1	0.010	0.004
2-NITROPHENOL	88-75-5	0.010	0.010
2,4-DIMETHYLPHENOL	105-67-9	0.010	0.006
BENZOIC ACID	65-85-0	0.050	0.010
bis(2-CHLOROETHOXY)METHANE	111-91-1	0.010	0.002
2,4-DICHLOROPHENOL	120-83-2	0.010	0.006
1,2,4-TRICHLOROBENZENE	120-82-1	0.010	0.002
NAPHTHALENE	91-20-3	0.010	0.002
4-CHLOROANILINE	106-47-8	0.010	0.004
HEXACHLOROBUTADIENE	87-68-3	0.010	0.002
4-CHLORO-3-METHYLPHENOL	59-50-7	0.010	0.008
2-METHYLNAPHTHALENE	91-57-6	0.010	0.002
HEXACHLOROCYCLOPENTADIENE	77-47-4	0.010	0.010
2,4,6-TRICHLOROPHENOL	88-06-2	0.010	0.006
2,4,5-TRICHLOROPHENOL	95-95-4	0.050	0.006
2-CHLORONAPHTHALENE	91-58-7	0.010	0.002
2-NITROANILINE	88-74-4	0.050	0.008
DIMETHYLPHTHALATE	131-11-3	0.010	0.002
ACENAPHTHYLENE	208-96-8	0.010	0.002
2,6-DINITROTOLUENE	606-20-2	0.010	0.006
3-NITROANILINE	99-09-2	0.050	0.008
ACENAPHTHENE	83-32-9	0.010	0.002
2,4-DINITROPHENOL	51-28-5	0.050	0.030
4-NITROPHENOL	100-02-7	0.050	0.008
DIBENZOFURAN	132-64-9	0.010	0.002
2,4-DINITROTOLUENE	121-14-2	0.010	0.006
DIETHYLPHTHALATE	84-66-2	0.010	0.002
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	0.010	0.008
FLUORENE	86-73-7	0.010	0.002
4-NITROANILINE	100-01-6	0.050	0.008
4,6-DINITRO-2-METHYLPHENOL	534-52-1	0.050	0.020
N-NITROSODIPHENYLAMINE	86-30-6	0.010	0.004

HOUSTON DRINKING WATER ABN (SEMI-VOLATILE) ORGANIC ANALYTES (CONT.)

ANALYTE	CAS #	CLP CRQL mg/l (ppm)	HOUSTON DL mg/l (ppm)
4-BROMOPHENYL-PHENYLETHER	101-55-3	0.010	0.008
HEXACHLOROBENZENE	118-74-1	0.010	0.002
PENTACHLOROPHENOL	87-86-5	0.050	0.015
PHENANTHRENE	85-01-8	0.010	0.002
ANTHRACENE	120-12-7	0.010	0.002
DI-n-BUTYLPHTHALATE	84-74-2	0.010	0.002
FLUORANTHENE	206-44-0	0.010	0.002
PYRENE	129-00-0	0.010	0.002
BUTYLBENZYLPHTHALATE	85-68-7	0.010	0.004
3,3'-DICHLOROBENZIDINE	91-94-1	0.020	0.010
BENZO(a)ANTHRACENE	56-55-3	0.010	0.008
CHRYSENE	218-01-9	0.010	0.008
bis(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.010	0.004
DI-n-OCTYLPHTHALATE	117-84-0	0.010	0.004
BENZO(b)FLUORANTHENE	205-99-2	0.010	0.008
BENZO(k)FLUORANTHENE	207-08-9	0.010	0.008
BENZO(a)PYRENE	50-32-8	0.010	0.003
INDENO(1,2,3-cd)PYRENE	193-39-5	0.010	0.008
DIBENZ(a,h)ANTHRACENE	53-70-3	0.010	0.008
BENZO(g,h,i)PERYLENE	191-24-2	0.010	0.008
BENZIDINE	92-87-5	NA	0.020

NA - Not analyzed for by CLP laboratory.

HOUSTON DRINKING WATER VOLATILE ORGANIC ANALYTES

ANALYTE	CAS #	CLP CRQL ug/l (ppm)	HOUSTON DL mg/l (ppm)
CHLOROMETHANE	74-87-3	0.010	0.005
BROMOMETHANE	74-83-9	0.010	0.005
VINYL CHLORIDE	75-01-4	0.010	0.005
CHLOROETHANE	75-00-3	0.010	0.005
METHYLENE CHLORIDE	75-09-2	0.005	0.005
ACETONE	67-64-1	0.010	0.005
CARBON DISULFIDE	75-15-0	0.005	0.005
1,1-DICHLOROETHENE	75-35-4	0.005	0.002
1,1-DICHLOROETHANE	75-34-3	0.005	0.002
1,2-DICHLOROETHENE (TOTAL)	540-59-0	0.005	NA
trans-1,2-DICHLOROETHENE	156-60-5	NA	0.002
cis-1,2-DICHLOROETHENE	156-59-2	NA	0.002
CHLOROFORM	67-66-3	0.005	0.002
1,2-DICHLOROETHANE	107-06-2	0.005	0.002
2-BUTANONE	78-93-3	0.010	0.005
1,1,1-TRICHLOROETHANE	71-55-6	0.005	0.002
CARBON TETRACHLORIDE	56-23-5	0.005	0.002
VINYL ACETATE	108-05-4	0.010	0.005
BROMODICHLOROMETHANE	75-27-4	0.005	0.002
1,2-DICHLOROPROPANE	78-87-5	0.005	0.002
cis-1,3-DICHLOROPROPENE	10061-01-5	0.005	0.002
TRICHLOROETHENE	79-01-6	0.005	0.002
DIBROMOCHLOROMETHANE	124-48-1	0.005	0.002
1,1,2-TRICHLOROETHANE	79-00-5	0.005	0.002
BENZENE	71-43-2	0.005	0.002
trans-1,3-DICHLOROPROPENE	10061-02-6	0.005	0.002
BROMOFORM	75-25-2	0.005	0.002
4-METHYL-2-PENTANONE	108-10-1	0.010	0.005
2-HEXANONE	591-78-6	0.010	0.005
TETRACHLOROETHENE	127-18-4	0.005	0.002
TOLUENE	108-88-3	0.005	0.005
1,1,2,2-TETRACHLOROETHANE	79-34-5	0.005	0.002
CHLOROBENZENE	108-90-7	0.005	0.002
ETHYL BENZENE	100-41-4	0.005	0.005
STYRENE	100-42-5	0.005	0.005
XYLENES (TOTAL)	1330-20-7	0.005	NA
O-XYLENE	95-47-6	NA	0.005
M-XYLENE AND/OR P-XYLENE	108-38-3 / 106-42-3	NA	0.005
ACROLEIN	107-02-8	NA	0.1
ACRYLONITRILE	107-13-1	NA	0.1

NA - Not analyzed for by CLP or Houston laboratory.

HOUSTON DRINKING WATER PESTICIDE/PCB ANALYTES

ANALYTE	CAS #	CLP CRQL mg/l (ppm)	HOUSTON DL mg/l (ppm)
alpha-BHC	319-84-6	0.00005	0.0002
beta-BHC	319-85-7	0.00005	0.0002
delta-BHC	319-86-8	0.00005	0.0003
gamma-BHC (lindane)	58-89-9	0.00005	0.0002
HEPTACHLOR	76-44-8	0.00005	0.0001
ALDRIN	309-00-2	0.00005	0.0002
HEPTACHLOR EPOXIDE	1024-57-3	0.00005	0.0001
ENDOSULFAN I	959-98-8	0.00005	0.0003
DIELDRIN	60-57-1	0.00010	0.0003
4,4'-DDE	72-55-9	0.00010	0.0005
ENDRIN	72-20-8	0.00010	0.0002
ENDOSULFAN II	33213-65-9	0.00010	0.0004
4,4'-DDD	72-54-8	0.00010	0.001
ENDOSULFAN SULFATE	1031-07-8	0.00010	0.0004
4,4'-DDT	50-29-3	0.00010	0.0006
METHOXYCHLOR	72-43-5	0.00050	0.0004
ENDRIN KETONE	53494-70-5	0.00010	NA
alpha-CHLORDANE	5103-71-9	0.00050	0.005
gamma-CHLORDANE	5103-74-2	0.00050	0.005
TOXAPHENE	8001-35-2	0.0010	0.005
AROCLOR-1016	12674-11-2	0.0005	0.005
AROCLOR-1221	11104-28-2	0.0005	0.010
AROCLOR-1232	11141-16-5	0.0005	0.005
AROCLOR-1242	53469-21-9	0.0005	0.005
AROCLOR-1248	12672-29-6	0.0005	0.005
AROCLOR-1254	11097-69-1	0.0010	0.005
AROCLOR-1260	11096-82-5	0.0010	0.005
ENDRIN ALDEHYDE	7421-93-4	NA	0.0001

NA - Not analyzed for by CLP or Houston EPA laboratory.

HOUSTON DRINKING WATER INORGANIC ANALYTES

ANALYTE	CAS #	CLP CRDL mg/l (ppm)	HOUSTON DL mg/l (ppm)
ALUMINUM	7429-90-5	0.200	0.1
ANTIMONY	7440-36-0	0.060	0.060
ARSENIC	7440-38-2	0.010	0.0046
BARIUM	7440-39-3	0.200	0.010
BERYLLIUM	7440-41-7	0.005	0.005
CADMIUM	7440-43-9	0.005	0.005
CALCIUM	7440-47-2	5.000	0.150
CHROMIUM	7440-47-3	0.010	0.010
COBALT	7440-48-4	0.050	0.020
COPPER	7440-50-8	0.025	0.020
IRON	7439-89-6	0.100	0.031
LEAD	7439-92-1	0.003	0.030
MAGNESIUM	7439-95-4	5.000	0.150
MANGANESE	7439-96-5	0.015	0.005
MERCURY	7439-97-6	0.0002	0.0002
NICKEL	7440-02-0	0.040	0.020
POTASSIUM	7440-09-7	5.000	1.000
SELENIUM	7782-49-2	0.005	0.0048
SILVER	7440-22-4	0.010	0.010
SODIUM	7440-23-5	5.000	0.500
THALLIUM	7440-28-0	0.010	0.0038
VANADIUM	7440-62-2	0.050	0.030
ZINC	7440-66-6	0.020	0.035
CYANIDE		0.010	0.02
ALKALINITY		NA	5
HARDNESS		NA	5

NA - Not analyzed for by CLP laboratory.

[illegible]

SITE NAME AND CODE: [illegible]
CASE NUMBER: [illegible]
Page 1 of 1
CONCENTRATIONS IN PARTS PER MILLION (ppm)
[illegible] by Ecology & Environment, Inc.

TRAFFIC REPORT NUMBER AND STATION LOCATION

Traffic Number			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Matrix			WATER	WATER	WATER	WATER	WATER
Percent Moisture							
Location			STN 1	STN 2	STN 3	STN [illegible]	STN [illegible]
and/or			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sample			WELL	WELL		WELL	[illegible]
Description							
Compound Name	CAS Number	Fraction					
BARIUM	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
CALCIUM	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
COPPER	[illegible]	[illegible]	[illegible]				
IRON	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
MAGNESIUM	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
ZINC	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
HARDNESS	----------	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
ALKALINITY	----------	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
BUTYL BENZYL PHTHALATE	85-68-7	BNA			[illegible]		
DI-n-BUTYL PHTHALATE	84-74-2	BNA			[illegible]		
DIETHYL PHTHALATE	84-66-2	BNA			[illegible]		
BENZYL ALCOHOL	100-51-6	BNA			[illegible]		
BENZOIC ACID	[illegible]	BNA			[illegible]		

VOA - VOLATILE BNA - ACID/BASE/NEUTRAL PES - PESTICIDE/PCB INO - INORGANIC
1 - [illegible]
J - [illegible]
R - [illegible]

Reference 19

RECORD OF COMMUNICATION	(Record of Item Checked Below) __Phone Call _x_Discussion __Field Trip __Conference __Other(Specify)	
To: Moshood Leshi TAT Site Project Manager Houston Office (713) 771-9460	From: Jairo Guevara FIT Chemical Engineer	Date: 9-12-90 Time: 9:30 a.m.

SUBJECT: Bull Oil and Chemical Transporters, Inc.

SUMMARY OF COMMUNICATION

Mr. Leshi stated that:

1. A report summarizing the characterization of the site and its findings is being written to EPA and will be published shortly.
2. The water table at the site was found to be at approximately 13 feet.
3. Subsurface soil sampling was conducted to a depth of 7 feet. Contamination with volatile organics was detected at this depth.
4. Contamination with volatile organics was detected in the three monitoring wells when they were sampled. See Table 1 with analytical results.
5. Characterization of the site was finished by the TAT in August 1990. Removal of soil at contaminated areas will be conducted in the near future.
6. The TAT evacuated the remaining water from the low ponded area. The soil of this area appears to be the most contaminated location at or near the site.
7. The last two drums with wastes were removed from the site by June 1990.

Jairo Guevara

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

MONITORING WELL ANALYTICAL RESULTS

Well#	MW-1			MW-2			MW-3			Blank
Samples Identified	1A	1B	1C	2A	2B	2C	3A	3B	3C	
Volatile Compounds										
1,2-Dichloroethane	1.9	1.6	1.5	Und	Und	Und	80	60	58	Und
Chloroform	Und	Und	Und	0.1	0.11	0.1	Und	Und	Und	Und
Trichloroethene	Und	Und	Und	0.036	0.038	0.036	Und	Und	Und	Und
Tetrachloroethane	Und	Und	Und	0.042	0.044	0.04	Und	Und	Und	Und

The samples were analyzed by the Keystone Laboratory.

Und = Undetected
Unit = mg/l (ppm)

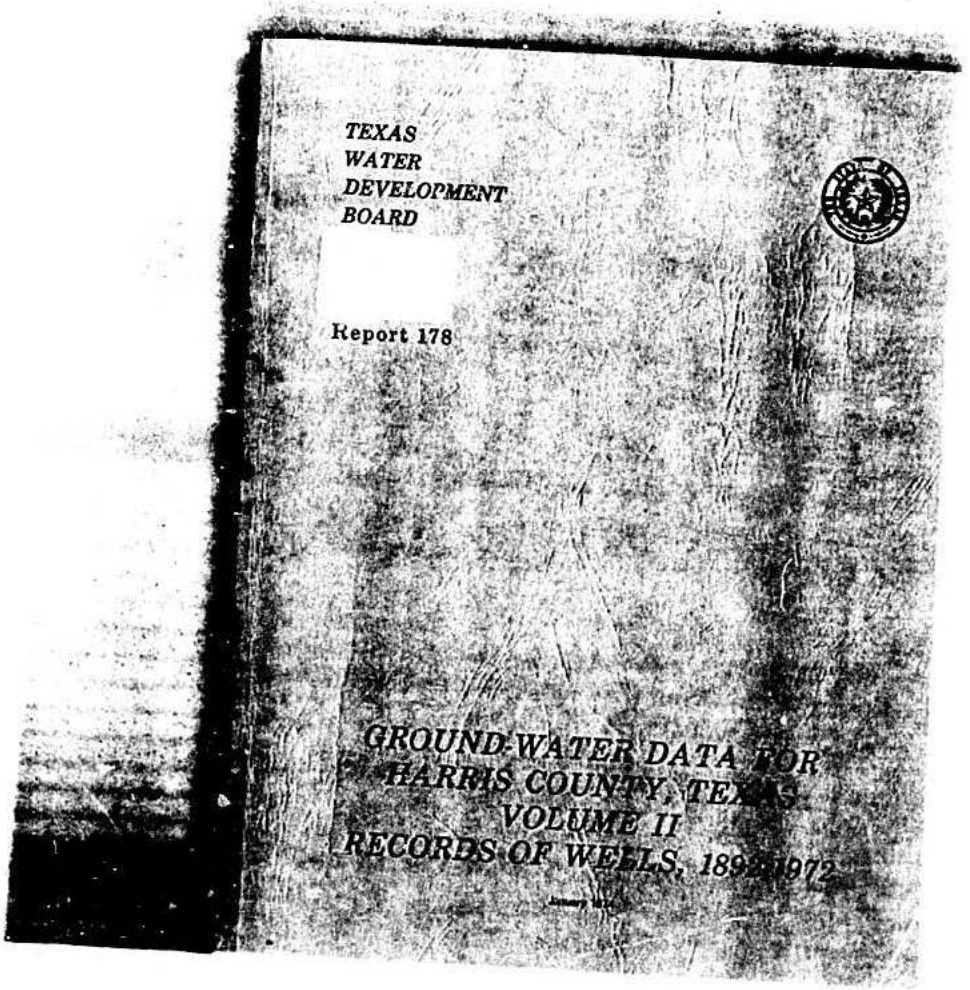
Source: Ecology and Environment, Inc. TAT (Houston).

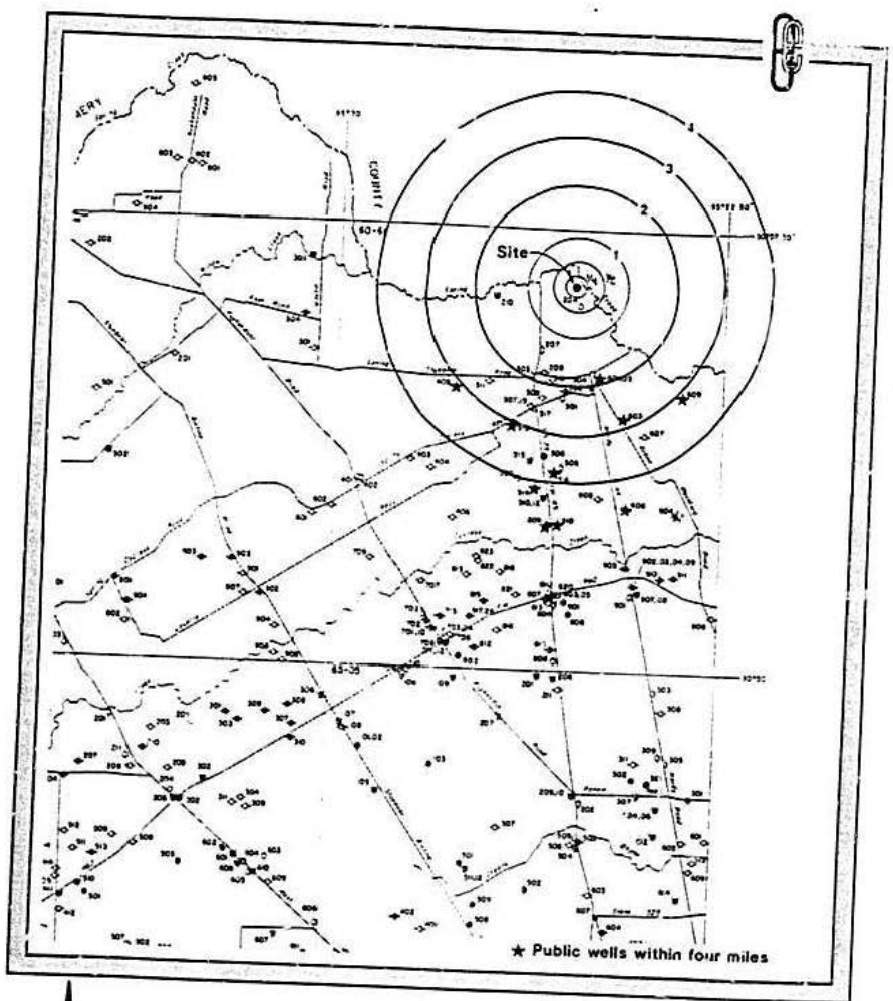
REF 19 (cont'd)

REFERENCE 20

DRAFT FINAL RULE
HAZARD RANKING SYSTEM

February 15, 1990


TEXAS
WATER
DEVELOPMENT
BOARD
Report 178
GROUND-WATER DATA FOR
HARRIS COUNTY, TEXAS
VOLUME II
RECORDS OF WELLS, 1893-1972



N

0 5'

**LOCATIONS OF PUBLIC WELLS
WITHIN A FOUR MILE RADIUS OF THE SITE
(HARRIS COUNTY)**

BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

Records of wells in Harris County--Continued

No.	Owner	Driller	Date com-pleted	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Depth (ft.)	Water bearing unit	Altitude of land surface (ft.)	Water level: Above (+) below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
60-40-903	Harris County WC and ID No. 1 Memorial Northw.	E. Christy Kuhlmann	1969	331	6 4½	310 331	C	121	106	June 1969	Sub.E	P	Screen from 311 to 331 ft. 2/
904	E. J. Firken	T. C. Bunnell and Son	1970	296	6 3½	272 296	C	111	95	Feb. 17, 1970	Sub.E	D	Screen from 296 to 296 ft. 2/
905	Mary Ehel	Schoppa Water Well Service	1969	456	8 2½	441 456	C	125	170	Aug. 5, 1969	Sub.E 1	D	Screen from 446 to 456 ft. 2/
906	Gordon Johnson	T. C. Bunnell and Son	1970	421	- 2	253 471	C	120	116	Feb. 21, 1970	Sub.E	D	Screen from 411 to 421 ft. 2/
907	Boyce Lewis	Schoppa Water Well Service	1969	203	6 2	175 2x2	C	129	56	Sept. 29, 1967	Sub.E 1	D	Screen from 193 to 203 ft. 2/
61-204	Unknown	Unknown	--	80	36	4.2	C	104	7.3	Jun. 29, 1906	H,N	N	Dug well, curbed with concrete.
207	Unknown	Unknown	--	33	36	33	C	136	33.6	June 1, 1931	N	N	Dug well. Well destroyed.
✓ 208	Dave Chenault	Cen-Tex Water Wells Co.	1965	182	2	182	C	126	55	Mar 20, 1966	Sub.E 6	D	Screen from 177 to 182 ft. Test hole drilled to 186 ft. 2/
210	Cockburn Oil Co.	Texas Water Wells, Inc.	1966	2,610	8 6	-- 2,610	J	107	Flows	May 1966	T,Ne	Unf	Screen from 2,450 to 2,500 ft. Used for water flooding 2/
601	W. F. Klenk	Unknown	1911	31	36	31	C	133	31.7 32.0	Sept 1911 Feb. 14, 1957	N	N	Dug well, curbed with brick. Well destroyed 1/
602	E. W. Klenk	F. Windleweed	1938	106	3 2	-- 106	C	132	23.0 34.7	Jan. 1938 Sept. 26, 1955	N	N	2/
✓ 603	Erwin H. Klein	Lowry Water Wells	1963	238	6 3½	211 234	C	131	53	Sept. 1962	--	In	Screen from 224 to 234 ft. 2/
✓ 604	Gene Gore	do	1962	243	6 3½	222 247	C	121	61	Sept. 1962	Sub.E 1.5	In	Screen from 233 to 243 ft. 2/
✓ 605	Greengate Acres	T. C. Bunnell and Son	1962	309	6 3½	286 309	C	133	90	Aug. 29, 1962	Sub.E 3	P	Screen from 298 to 309 ft. Supplies subdivision. 2/
✓ 606	Blackstall	Schoppa Water Well Service	1970	224	4	224	C	116	70	Jan. 5, 1970	Sub.E	In	Screen from 214 to 224 ft. 2/
501	L. L. Day	Unknown	1932	365	6 3½	60 365	C	124	18 88.1	Aug. 1932 Oct. 29, 1963	N	N	Screen from 355 to 365 ft. Reported flowing for 1964.
502	C. Wuensche School	Unknown	1939	365	6	365	C	124	19 97.6 63.6	1939 Oct. 29, 1963 Aug. 29, 1966	N	N	Formerly supplied school, replaced with new well. Started to flow May 1964.
503	E. W. Wuensche	Unknown	--	35	36	35	C	131	29.3 23.2	June 1, 1931 Oct. 29, 1963	N	N	Dug well, curbed with brick.
504	Rincomori Perlic Railroad	Unknown	1912	1,077	8	1,072	K	122	90.6 104.7	Oct. 29, 1963 Feb. 3, 1971	N	N	Reported flowing 24 ft. above surface in 1912. Estimated flow 50 gpm in 1931. Formerly supplied water for locomotives and city of Spring. 1/ 2/
505	W. F. Windleweed	Unknown	1891	32	72	32	C	114	24.0 21.1	Nov. 9, 1931 Mar. 3, 1961	N	N	Dug well, curbed with brick. Well destroyed. 2/
506	do	U.S. Geological Survey	1931	16	3	16	C	117	14.6 9.9	Nov. 20, 1931 Sept 22, 1950	N	N	Bored well. Sandpoint on bottom. Well destroyed. 2/
✓ 507	Southwestern Bell Telephone Co.	Lowry Water Wells	1964	329	6 2½	304 329	C	124	90	Mar. 13, 1964	Sub.E 15	D	Screen from 308 to 329 ft. 2/

See footnotes at end of table

Records of wells in Harris County--Continued

No.	Owner	Driller	Date completed	Depth of well (ft)	Casing: Diameter (in.)	Casing: Depth (ft.)	Water bearing unit	Altitude of land surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Hardy-506	E. H. Hunsucker, Jr.	H. M. Littlejohn Water Well Service	1964	230	4	170	K	103	15	May 3, 1964	Sub.E 1	D	Screen from 168 to 170 ft.
510	American Telephone and Telegraph Co.	Layne Texas Co.	1964	341	6 4	240 341	K	103	40	Apr. 29, 1964	Sub.E 1	Ind	20 ft. of screen between 287 and 317 ft. Reported yield 24 gpm with 29 ft. drawdown when drilled.
511	Hunt Town	Evans Water Wells	1-1	248	6 4	221 248	K	111	15	Oct. 19, 1967	Sub.E 1	D	Screen from 277 to 287 ft.
512	American Telephone and Telegraph Co.	Layne Texas Co.	1964	341	6	40	K	105	40	Nov. 17, 1964	Sub.E 1	Ind	Screen from 333 to 373 ft. Reported yield 24 gpm with 8 ft. drawdown when drilled.
513	Consumer Water Corp. Springmont Subdivision	T. J. Maxwell and Son	1964	340	6 4	298 340	K	122	--	--	Sub.E 1	P	20 ft. of screen between 300 and 345 ft.
514	Harris County MC and ID No. 11 Enchanted Oaks Well 2	Katy Drilling Co.	1964	1,092	16 12	674 1,092	K	106	104	Dec. 23, 1964	T.E 100	P	164 ft. of screen between 888 and 1,060 ft. Reported yield 1,632 gpm with 115 ft. drawdown when drilled.
515	Goodyear Tire and Rubber Co.	Texas Water Wells, Inc.	1964	542	14 8	400 542	K	111	103	May 1964	T.E 30	Ind	63 ft. of screen between 463 and 530 ft. Reported yield 616 gpm with 80 ft. drawdown when drilled. Test hole drilled to 561 ft. Supplies Goodyear Blimp base.
516	Harris County MC and ID No. 46 North C-3 Estates	Layne Texas Co.	1964	530	16 8	486 530	K-J	111	101	July 21, 1964	T.E 60	P	80 ft. of screen between 410 and 530 ft. Reported yield 960 gpm with 71 ft. drawdown when drilled. Test hole drilled to 553 ft.
517	Walsh Oil Co.	Evans Water Wells	1964	340	6 4	320 340	K	119	99	July 9, 1964	Sub.E 1	Ind	Screen from 324 to 334 ft. Supplies service station.
518	Parker Brothers and Co.	Schlumberger Surveys	1964	890	6 4	834 890	K	125	105	Oct. 5, 1964	Sub.E 5	D	Screen from 843 to 890 ft. Needs min conversion.
519	Southwestern Bell Telephone Co.	Evans Water Wells	1964	570	6 4	317 333	K	124	99	Aug. 19, 1964	Sub.E 10	Ind	Screen from 318 to 333 ft.
520	Charles M. Haynes	Schlumberger Surveys	1964	344	20	200	K	114	91	Apr. 1964	T.E 1	D	Screen from 190 to 200 ft. Plastic screen.
521	Mayer Lumber Co. Well 1	J. T. Jeffries	--	230	8	221	K	119	76 59.4	July 1961 Aug. 29, 1964	Sub.E	P	
522	Harris County MC and ID No. 42 Lexington Woods	T. Moody Hutchens	1964	330	6 4	286 326	K	126	85	Mar. 29, 1964	Sub.E 5	P	Screen from 288 to 324 ft.
523	Timberlane Municipal Utility District Well 1	Layne Texas Co.	1969	990	24 16 12	396 600 990	K-J	92	111	Dec. 20, 1969	T.E 125	P	165 ft. of screen between 600 and 965 ft. Reported yield 1,227 gpm with 77 ft. drawdown when drilled. Test hole drilled to 1,307 ft.
524	Mayer Lumber Co. Well 2	Schlumberger Surveys	1971	534	8 5	373 534	K-E	121	109	June 24, 1971	Sub.E 10	P	70 ft. of screen between 390 and 534 ft.
525	Stonegate Mobil Home Park	T. J. Maxwell and Son	1970	520	6 4	477 520	K-J	130	112	Aug. 22, 1970	Sub.E 5	P	52 ft. of screen between 382 and 520 ft.
607	J. P. Pogue	H. L. Hale Drilling Co.	1963	232	6 4	192 232	K	119	93	Sept. 10, 1963	Sub.E 1	D	7 in from 240 t. [illegible]
608	M. C. O'Brien	do	1969	230	6 4	192 214	K	100	55	Nov. 31, 1969	Sub.E 1	D	Screen from 240 to 214 ft.

See footnotes at end of table

Records of wells in Harris County—Continued

No.	Owner	Driller	Date completed	Depth of well (ft.)	Casing: Diam. (in.)	Casing: Depth (ft.)	Water bearing unit	Altitude of land surface (ft.)	Water level: Above (+) or below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
60-61-609	Harris County MC and ID No. 92 Lexington Florin	Texas Water Wells, Inc.	1969	3,996	16 10	363 1,004	K	114	164	Aug. 20, 1969	T,S	P	230 ft. of screen between 504 and 1,004 ft. Reported yield 1,060 gpm with 46 ft. drawdown when drilled. Test hole drilled to 1,191 ft. 2/
701	Bammel Forest Utility Co.	W. J. Heinmark Co.	1957	420	4 4	340 420	C	120	--	--	T,S 15	P	Screen from 340 to 420 ft.
702	John Jones	W. L. Wilson	1923	534	9	534	C	120	26.3	Sept. 28, 1922	N	N	
703	C. H. Bammel	Unknown	--	24	48	24	C	119	19.2	Mar. 27, 1931	N	N	70 ft. of screen between 170 and 194 ft. Flowing 4 in. stream in 1912.
704	do	A. E. Fawcett, Jr.	1929	142	4 3 2	40 132 142	C	116	23.4 23.9	Apr. 27, 1931 Mar. 23, 1945	--	N	Dug well, curbed with concrete. Well destroyed. 2/ 3/
705	John Jones	W. L. Wilson	1923	137	4	137	C	118	4.8 30.6	Aug. 27, 1943 Feb. 14, 1949	N	N	Well destroyed. 2/
706	Charles H. Bammel	Lowry Water Wells	1952	242	4	242	C	114	47 42 /	July 1952 Feb. 9, 1971	Sub.E	D	Screen from 227 to 242 ft. 2/
707	J. F. Koerner	Turbine Pump Service	1962	247	6 3½	-- 247	C	90	43	Nov. 27, 1962	C,G	S	Screen from 232 to 247 ft. 2/
708	Atlantic Richfield Co.	H and T Water Well Drilling	1968	350	6 3½	330 350	C	114	40	Oct. 29, 1968	Sub.E 2/	Ind	Screen from 246 to 2.0 ft. Supplies service station. 2/
709	Charlie H. Bammel	Schoppe Water Well Service	1968	373	6 3½	357 373	C	122	104	Nov. 20, 1968	Sub.E	D	Screen from 363 to 373 ft. 2/
710	Bammel Forest Utility Co.	Layne Texas Co.	1969	900	16 8	300 860	K	119	132	Apr. 24, 1969	T,E 40	P	116 ft. of screen between 306 and 440 ft. Reported yield 324 gpm with 72 ft. drawdown when drilled. Test hole drilled to 720 ft. 2/
711	Safeway Stores, Inc. Well 2	Lowry Water Wells	1971	430	6 4	360 430	C	116	117	Mar. 23, 1971	Sub.E	Ind	60 ft. of screen between 422 and 430 ft. 2/
712	Safeway Stores, Inc. Well 3	do	1971	435	6 4	364 436	C	118	117	Mar. 30, 1971	Sub.E	Ind	60 ft. of screen between 367 and 428 ft. 2/
713	Harris County MC and ID No. 91 Pondcross Forest	Layne Texas Co.	1971	1,243	16 10	585 1,165	K	120	162	Jan. 29, 1971	T,E 150	P	180 ft. of screen between 985 and 1,152 ft. Reported yield 1,043 gpm with 60 ft. drawdown when drilled. Test hole drilled to 1,232 ft. 2/
801	Nick and Andrew George	Katy Drilling Co.	1953	1,170	20 12	315 1,170	K,C	114	--	--	N	N	Casing slotted from 324 to 1,170 ft. Not used since 1968. Formerly used for rice irrigation. 2/
802	Johnie George	do	1954	640	20 12	320 640	K,C	114	--	--	T,Ng	Irr	Casing slotted from 598 to 640 ft. 2/
803	C. P. Addison	Unknown	1926	20	48	20	C	101	16.2 3.8	Feb. c. 1926 June 8, 1942	N	N	Dug well, curbed with brick. Well destroyed. 2/
804	do	Unknown	1931	135	4	135	C	114	27.3	Nov. 9, 1931	N	N	Formerly supplied service station.
805	do	Unknown	--	45	6	45	C	1.0	16.4 26.4	Nov. 9, 1931 June 28, 1934	N	N	Formerly supplied service station. Well destroyed. 2/
806	Steve Pesek	Unknown	--	17	36	17	C	112	13.0	Nov. 9, 1961	N	--	Dug well [illegible] with concrete. Well destroyed.

See footnotes at end of table.

Records of wells in Harris County--Continued

No.	Owner	Driller	Year completed	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Depth (ft.)	Water bearing unit	Altitude of land surface (ft.)	Above (+) or below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
00-01-907	R. L. Glenn	Grubb and Hamilton	19.2	356	4	346	C	116	22.3	Aug. 26, 1963	N	N	Formerly supplied water for oil test well destroyed. 1/
908	Nick George	Katy Drilling Co.	1964	490	20 12	353 482	C, K	117	67.4 ---	Feb. 20, 1969	N	N	
909	Dickson and Jaramek	Lowry Water Wells	1964	381	4 2	192 242	C	97	66	Feb. 1966	Sub. 1	P	Casing slotted from 180 to 242 ft. Not used since 1966. Formerly used for crop irrigation. Test hole drilled to 724 ft. 2/
910	Harris County MC and ID No. 99 North Hill Estates	E. L. Wade Drilling Co.	1963	390	4	385	C	92	66	July 3, 1963	Sub. 1	P	25 ft. of screen between 199 and 242 ft 2/
911	Texaco Inc.	Lowry Water Wells	1967	334	4 2½	319 334	C	111	97	Aug. 7, 1967	Sub. 1	P	Screen from 375 to 395 ft. 2/
912	J. N. Pressley Silverwoods Subdivision	do	1967	217	4 2½	190 213	C	113	88	June 6, 1967	Sub. 1	Ind	Screen from 310 to 333 ft. Supplies service station. 2/
913	R. E. Butler	Hitchcock Oil Service	1967	229	4 2½	210 229	C	114	62	Dec. 19, 1967	Sub. 1	P	Screen from 187 to 217 ft. Test hole drilled to 240 ft. 2/
914	North Forest Water Supply Corp. Well 1	Layne Texas Co.	1968	1,210	16 10	780 1,170	K	112	102	July 25, 1968	N.U. 125	P	Screen from 316 to 329 ft. Test hole drilled to 233 ft. 2/
915	R. A. Becker	E. L. Wade Drilling Co.	1968	126	4 2½	208 226	C	102	52	Mar. 28, 1968	Sub. 1	D	150 ft. of screen between 780 and 1,155 ft. Reported yield 1,022 gpm with 90 ft. drawdown when drilled. Test hole drilled to 1,202 ft. 2/
916	C. W. McLemore	do	1968	221	2½	221	C	115	72	Mar. 28, 1968	J,E 1	D	Screen from 216 to 226 ft. 2/
917	Harris County MC and ID No. 91 Henderson Forest Well 1	Katy Drilling Co.	1967	752	16 8	346 752	K	114	106	Oct. 25, 1967	T,E	P	Screen from 211 to 221 ft. 2/
918	L. J. Nagy	E. L. Wade Drilling Co.	1968	298	4 2½	274 296	C	114	94	May 20, 1968	Sub. 1	D	132 ft. of screen between 554 and 742 ft. Reported yield 717 gpm with 68 ft. drawdown when drilled.
919	Harris County MC and ID No. 135 Westador Subdivision	Layne Texas Co.	1969	1,020	16 10	578 1,020	K	11-	135	July 21, 1969	T,E 1	P	Screen from 283 to 298 ft. 2/
920	Shell Oil Co.	Lowry Water Wells	1970	347	4 2½	327 347	C	115	66	Apr. 1, 1970	Sub. 1	Ind	150 ft. of screen between 580 and 1,000 ft. Reported yield 1,001 gpm with 73 ft. drawdown when drilled. Test hole drilled to 1,081 ft. 2/
921	W. E. Hoffman	E. L. Wade Drilling Co.	1968	275	2½	275	C	117	62	Sept. 9, 1968	J,E 1	D	Screen from 252 to 267 ft. Supplies service station. 2/
922	Jake Goodner	Lowry Water Wells	1958	222	4 2½	212 222	C	105	57	Mar. 2, 1969	Sub. 1	D	Screen from 265 to 275 ft. 2/
923	J. D. Watson	do.	1970	213	4 2½	200 213	C	96	83	Mar. 19, 1970	Sub. 1	D	Screen from 207 to 217 ft. 2/
924	Harris County MC and ID No. 91 Henderson Forest Well 2	Stone-Schevis, Inc.	1971	1,234	16 10	950 1,234	K	114	14-	July 26 1971	T,E	P	Screen from [illegible] ft. 2/ 166 ft. of screen between 950 and 1,234 ft. Reported yield 1,025 gpm with 120 ft. drawdown when drilled. Test hole drilled to 1,313 ft. 2/

See footnotes at end of table.

Records of wells in Harris County, Continued

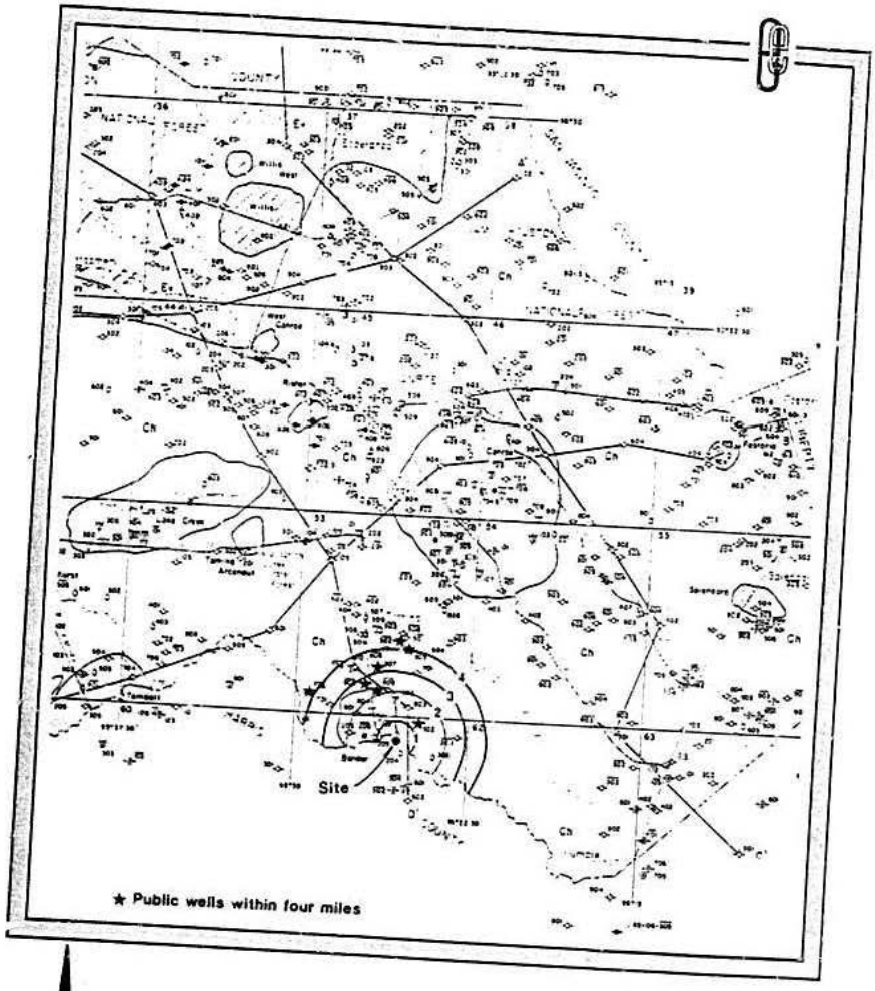
No.	Owner	Driller	Date completed	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Depth (ft.)	Water bearing unit	Altitude of land surface (ft.)	Water level: Above (+) or below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
465-61-901	Marshall Sley	Unknown	--	70	30	70	C	107	14 ?	Nov 10 1931	N	N	Dug well, curbed with concrete. Well destroyed.
* 902	W. Tautenhahn	Layne Drilling Co.	1939	773	12 8	703	A	130	37.5 124.6	Aug 31 1939 Feb 26 1971	N	N	Screen from 750 to 772 ft. Formerly City of Houston test well 10-A. 1/
* 903	do	do	1939	1,652	12 8	32	A	104	-72.6 134.0	May 31 1939 May 24 1971	N	N	Screen from 1,627 to 1,652 ft. Formerly City of Houston test well 9. Test hole drilled to 1,900 ft. 1/ 2/
904	do	U. S. Geological Survey	1940	21	12	21	C	104	14.2 20.0	June 21 1940 June 22 1951	N	N	Bored test well. Sandpoint on bottom. 1/
* 905	Inverness Forest Well 1	Layne Texas Co.	1966	560	20	475 560	A	91	+2	Apr 12 1966	T.A En	P	Screen from 485 to 530 ft. Reported yield 650 gpm with 16 ft. drawdown when drilled. Test hole drilled to 614 ft. 2/
906	Everet Sies	C. L. Moyo Drilling Co.	1969	216	3	216	C	94	44	Feb 7 1969	T.A	D	Screen from 206 to 216 ft. 2/
907	Builders Supply Co. Well 1	Emery Water Wells	1968	632	6 4	551 632	A ?	107	122	Oct 14 1968	Sub.A 15	Ind	50 ft. of screen between 580 and 632 ft. Ready mix concrete. 2/
908	Builders Supply Co. Well 2	do	1968	632	8	632	A ?	107	122	Oct 24 1968	Sub.A 15	Ind	50 ft. of screen between 580 and 632 ft. Ready mix concrete.
909	St. Matthews Lutheran Church	Emery Water Wells	1969	306	6 2½	156 306	C	104	24	Mar 14 1969	Sub.A 1	P	Screen from 156 to 306 ft. Supplies church. 2/
910	Alpha Realty Co Memorial Hills Addition	A. Christy Kuhlmann	1969	303	6 2½	273 303	C	94	114	Apr 1969	Sub.A	N	Screen from 290 to 301 ft. Formerly supplied subdivision. 2/
911	Mem.-al Hills	Texas Water Wells, Inc.	1968	1,324	16 10	636 1,324	A	140	137	Oct 1969	T.A	P	370 ft. of screen between 665 and 1,309 ft. Reported yield 1,210 gpm with 135 ft. drawdown when drilled. 1/
63-03-101	M and TC Railroad	W. F. Tautenhahn Co.	1930s	125	8 6	109 120	C	132	47.0 45.2	Sept 22 1957 Feb 28 1971	N	N	Screen from 108 to 120 ft. Water level reported on well. 1/
102	Ben L. Pugh	A. M. Zeltner	1950	347	24 13	200 347	A	130	33.0	Mar 20 1961	T.A 125	Irr	300 ft. of slotted casing. 2/
103	C. M. Lindsey	Layne Texas Co.	1951	892	16 12	305 892	A, C	135	84	Mar 1953	T.A	Irr	324 ft. of slotted casing between 312 and 892 ft. Reported yield 2,436 gpm with 80 ft. drawdown when drilled.
104	W. J. McArella	W. F. Longerbaugh	1939	499	22 16	136 499	C, A	111	4.0 41.9	May 8 1939 Mar 9 1971	T.A 75	Irr	Casing slotted at intervals between 15 and 499 ft. 1/
105	E. C. Smith	U.S. Geological Survey	1931	21	2	21	C	104	2.1 1.2	Nov 5 1931 Jan 10 1947	N	N	Well destroyed. 2/
106	Rees Mitchell	Layne Texas Co.	1926	156	6	156	C	106	1.0 -3.4	Apr 5 1931 Feb 17 1956	T	N	Screen from 136 to 156 ft. Well destroyed. 2/ 3/
* 106	M and TC Railroad	Unknown	old	600	8	600	C	134	12.4	May 23 1941	N	N	Dug to 35 ft. Drilled from 35 to 600 ft. Well destroyed.
202	F. Hitzman	Barnes and Dunn	1926	44	4	44	C	113	+.0	Apr 3 1931	N	N	Formerly industrial well. Well destroyed.
203	P. H. Skinner	Unknown	--	1,717	6	1,717	J	111	Flow	1931	N	N	Oil test. Flow in 1931 about 1 gpm with gas. Test hole drilled to 2,369 ft. 2/

See footnotes at end of table

TEXAS
WATER
DEVELOPMENT
BOARD

Report 136

GROUND-WATER RESOURCES OF MONTGOMERY COUNTY, TEXAS



LOCATIONS OF PUBLIC WELLS
WITHIN A FOUR MILE RADIUS OF THE SITE
(MONTGOMERY COUNTY)
BULL OIL AND CHEMICAL TRANSPORTERS, INC.
SPRING, TEXAS
TXD092488741

Table 7.--Records of Wells in Montgomery and Adjacent Counties--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
TS-60-33-111	C. Layton	1967	148	2	Ew	[illegible]	48.5	July 9, 1967	A,E	D	Screened from 138 to 148 ft. Water salty.
402	Doral M. Lollar	--	460	4	Ew	144	50	1966	T,E, 3	D	Screened from 450 to 460 ft.
403	--	--	600	4	Ew	152	56.2	Sept. 16, 1966	S,E, 3	D	
404	--	--	90	36	Ew	144	29.3	do	J,E, 1	D	
501	A.J. Rod and Co.	1904	1,720	6	Ew	121	32.3	Aug. 24, 1966	U,E, 5	D	Screened from 800-810 ft.
502	H.J. Schott	1902	1,800	8 - 4	Ju	122	+ 46 + 10	1902 Aug. 1966	Flows	F	Reported yield 750 gpm. Estimated yield 450 gpm. Screened from 1540 to 1580 ft.
503	Blair and Sons	--	21	24	C	130	16.2 14.3	Nov. 18, 1931 1953	H	U	Destroyed. 3/
504	E.W. Gestle:chould:	--	35	24	C	149	29.8 30.8	June 2, 1931 June 10, 1958	B,H	U	Destroyed on September 17, 1958 by road construction. 3/
506	R. Joe Savoie	1965	211	4	Ew	148	57.2	Sept. 19, 1966	S,E, 1 1/2	D	Screened from 201 to 211 ft.
507	--	--	60	24	C	142	28.0	Aug. 26, 1966	H	U	
508	Charles Rod	1966	250	4	Ew	119	33.5	do	S,E	D	
509	Tamina Berber Shop	--	40	2	C	137	27.3	Sept. 16, 1966	J,E, 1/4	Ind	Screened from 240 to 250 ft.
601	Clyde Paul	1939	274	4 - 2	Ew	97	+ 12.5 10	June 25, 1962 Aug. 1966	J,E, 1	D	Screened from 188 to 208 ft and 264 to 274 ft. Flowed 60 gpm September 1939.
603	C.C. Collier	1962	340	4	Ew	116	70	1962	J,E	D	Screened from 330 to 340 ft.
604	do	1952	40	3	C	116	20.7	Aug. 19, 1966	H	U	Abandoned because of iron problem and screen failure.
605	Clyde Paul	1960	287	2	Ew	117	25.5	do	J,E, 1/2	D	
606	--	--	26	3	C	112	18.4	do	B,H	U	
701	Monroe	1964	220	4	Ew	132	18.5	do	S,E	D	Screened from 210 to 220 ft.
704	Kendal Oil Corp.	1964	508	8 - 6	Ew	135	53.5	Aug. 26, 1966	S,E	F	Screened from 331 to 346 ft, 366 to 386 ft, [illegible]-23 ft, 470 to 485 ft, and 485 to 500 ft. 3/
706	Grogan's Mill	before 1931	171	6	Ew	145	23.2	June 2, 1931	H	U	Destroyed.
801	H.M. Lee	1964	230	4	Ew	123	57.9	Aug. 26, 1965	S,E	D	
802	Sinclair Oil Co.	--	45	4 - 2	C	119	21.0	do	J,E	Ind	

See footnotes at end of table.

Table 1.--Records of Wells in Montgomery and Adjacent Counties--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING BEDS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	WATER LEVEL METHOD OF LIFT	USE OF WATER	REMARKS
[illegible]-40-51-803	Slick Oil Co.	1958	6,093	--	--	114	--	--	--	--	Oil test. 2/
804	E.B. Hable and Son, Inc.	1966	272	4	Ev	130	51.1	Nov. 14, 1966	S,E, 2	Ind	Screened from 262 to 272 ft.
805	Lake Chateau Woods	1965	236	4	Ev	122	38.2	Aug. 24, 1966	S,E, 1	P	Reported yield 75 gpm. Screened from 210 to 230 ft. 1/
806	do	1906	825	4	Ev,C	139	+ 1.0	do	Flows	U	Originally 1700 ft oil test; plugged in 1916 to 825 ft.
807	Oak Ridge North	1965	234	4	Ew	132	49.3	do	S,E, 1	P	Screened from 204 to 214 ft and 224 to 234 ft.
808	do	1964	239	4	Ew	136	53.2	do	S,E, 5	P	Screened from 219 to 229 ft and 229 to 239 ft.
809	do	1965	247	4	Ew	123	49.6	do	S,E, 5	P	Screened from 227 to 247 ft.
810	C.W. Coffey	1955	6,202	--	--	145	--	--	--	--	Oil test. 2/
901	Saunders	1955	220	4	Ew	118	44.4	Aug. 27, 1966	S,E	D	Screened from 210 to 220 ft.
54-101	Humble Club	1966	195	2	Ew	154	44.3	June 23, 1966	S,E	P	Reported yield 13 gpm. Screened from 185 to 195 ft. 1/
102	Humble Oil Co.	--	165	10	Ew	153	2.6	June 23, 1966	S	U	
103	Sun Oil Co.	1933	183	4	Ew	155	29.2	Oct. 9, 1962	N	U	Destroyed.
201	W.D. Granger	1961	120	3	Ew	152	28	Oct. 1962	N	U	Do.
301	Frank Beeson	1956	45	10	C	135	18.5	June 15, 1966	S,E	D	
302	Atlantic Refinery Co.	1944	10,708	16	--	132	17.1	June 26, 1969			
303	R.D. Lee	--	209	2	Ew	132	18	--	--	--	Oil test. 2/
304	James Dugat	--	50	12	C	122	13.5	1969	S,E, 1/2	D	Screened from 199 to 209 ft.
305	--	--	39	--	C	131	14.5	June 15, 1966	S,E, 1/1	D	
401	Morgan	--	60	4	C	142	19.9	June 26, 1969	--	D	Reported yield 5 gpm.
402	G.A. Nelson	1964	130	2	Ew	137	42	June 10, 1966	S,E, 1/1	D	
403	John O'Brien	1963	35	2	C	140	6.5	Dec. 1964	S,E, 1/2	D	Screened from 125 to 131 ft. 1
502	R.R. Ransom	1964	222	2	Ew	128	38	June 10, 1966	P,E, 1/4	D	
503	Charles Owen	--	210	2	Ew	138	30	1964	S,E, 1	D	Screened from 212 to 222 ft.
601	T.V. Gilchrist	--	129	2	C	113	25	1966	S,E, 1/2	D	Screened from 200 to 210 ft.
								--	P,H	D	Screened from 126-129 ft.

See footnotes at end of table.

Table 7.--Records of Wells in Montgomery and Adjacent Counties--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL ABOVE (+) OR BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
TS-60-59-205	Christie-Mitchell-Mitchell	1954	1,702	--	--	190	--	--	--	--	Oil test. 1/
305	Paul Stonecipher	1964	95	4	Ev	164	15	1964	J,E	D	
61-201	Sinclair Oil Corp.	1955	400	9 - 6	Ev	[illegible]	45.8	June 26, 1966	S,E, 2 1/2	Ind	Reported yield 60 gpm. Screened from 370-400 ft.
203	Steen Woods	--	300	4	Ev	116	54.2	Aug. 26, 1966	S,E	D	
205	Pursuell	1950	67	4	C	99	9.6	do	N	U	
206	C.L. Fitch	1926	455	4	Ev	99	+ 12.0	June 1, 1931	--	U	Destroyed. 1/
302	Archer Dev. Co.	1966	333	6 - 4	Ev	106	46.7	Aug. 26, 1966	S,E, 5	F	Reported yield 100 gpm. Scree 1 from 315-330 ft.
303	O.E. Wilcoxson	--	73	4	Ev	105	31.6	do	Flows	U	
304	Mrs. Oscar Locke	1964	198	4	C	111	12	1964	J,E	D	
62-301	Floyd Oil Co.	1938	6,617	--	--	104	--	--	--	--	Oil test. 1/ 2/
302	Lillian Dunkle	1956	331	6	Ev	100	62.7 62.9	June 8, 1966 June 16, 1966	S,E, 3/4	D	Screened from 320-330 ft.
303	Floyd Sorter	1963	190	2	Ev	92	60	1963	J,E	D	
601	Baker Brothers	1917	992	4	Ev	81	+ 3.0	Aug. 29, 1966	Flows	F	1/
602	John F. Wheeler	1962	57	2	C	84	14	Apr. 1962	J,E, 1/3	D	Reported yield 30 gpm. Screened from 51-57 ft.
63-101	H.L. McConnell	1962	74	2	C	96	29.0	June 8, 1962	A,E, 1	D	Reported yield 5 gpm. Drawdown 4 ft. Screened from 68-74 ft. 1/
102	Dale Drago	1965	100	4	C	101	34.5 35.8	June 29, 1966 June 27, 1969	J,E, 1/2	D	Screened from 80-100 ft.
103	Walker	1965	358	2	Ev	100	37	Feb. 1965	J,E, 1 1/2	D	
105	New Caney Independent School Dist.	1966	393	6 - 4	Ev	100	65.8	June 7, 1966	S,E,15	F	Reported yield 230 gpm. Screened from 332-352 ft and 373-393 ft. 1/
201	E.N. Oakley	1934	38	28	C	100	26	--	J,E	D	
202	Mrs. J.D. Scott	1965	251	2	Ev	82	50	Mar. 1965	J,E, 1	D	
401	Mr. Sanford	1964	67	3	C	80	18.0	June 9, 1966	J,E	F	
402	Sam Moreno	1966	255	6	Ev	80	50.3	do	S,E, 1 1/2	D	Screened from 240-250 ft.
403	V.H. Edwards	1962	81	4	C	77	15	May 1962	J,E, 1/3	D	Reported yield 5 gpm. Drawdown 25 ft. Screened from 70-78 ft. 1/

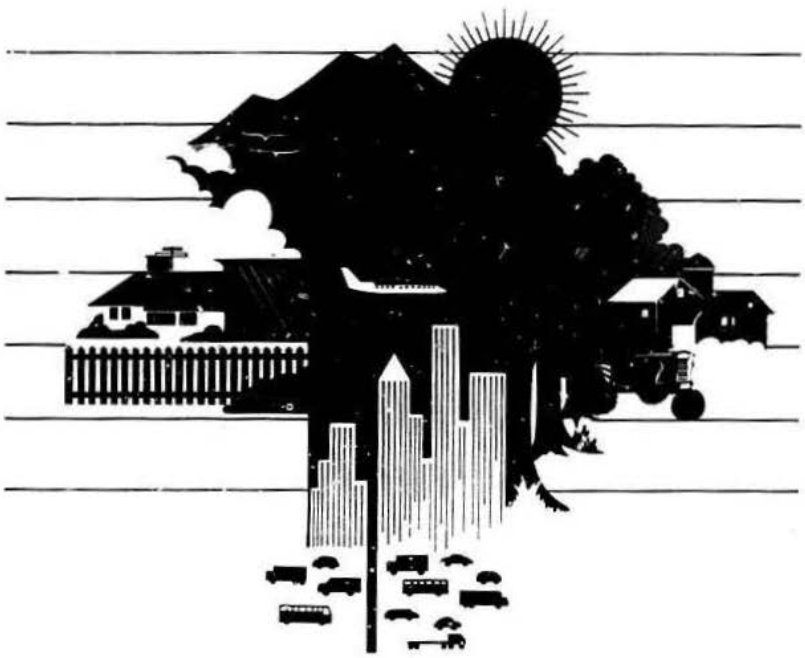
See footnotes at end of table.

A Statistical Abstract Supplement

REFERENCE 23

County and City Data Book

1988



U.S. Department of Commerce BUREAU OF THE CENSUS

Table B. Counties — **Population Characteristics and Households**

County	Population characteristics—Con.												Households					
	1984—Con.									1980			1985			1980		
	Percent—									Percent—							Percent—	
	Under 5 years	5 to 14 years	15 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	American Indian, Eskimo, and Aleut	Asian and Pacific Islander	Hispanic[1]	Number	Percent change, 1980–1985	Persons per household	Number	Female family householder[2]	One person[3]
	14	12	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TEXAS—Con.																		
Falls	5	5	5	5	5	5	5	5	5	14	12	942	6 800	-1.8	2.53	6 920	10.6	29.5
Fannin	6.9	14.2	11.9	11.5	12.0	10.0	11.7	12.0	9.9	25	11	1.33	9 300	-.6	2.54	9 267	9.8	23.2
Fayette	5	5	5	5	5	5	5	5	5	14	08	574	7 900	5.4	2.56	7 487	5.7	22.0
Fisher	5	5	5	5	5	5	5	5	5	17	10	1679	3 100	-4.7	2.67	3 254	6.4	25.0
Floyd	5	5	5	5	5	5	5	5	5	23	12	33.89	3 100	-6.4	2.88	3 307	5.2	20.4
Foard	5	5	5	5	5	5	5	5	5	19	20	1103	700	-14.6	2.48	820	7.1	26.0
Fort Bend	10.9	18.4	13.0	25.0	16.2	7.4	5.1	2.5	1.5	21	2.69	20.37	57 970	44.5	3.15	39 840	6.6	16.0
Franklin	5	5	5	5	5	5	5	5	5	26	15	1.12	2 700	4.0	2.58	2 619	5.0	22.0
Freestone	5	5	5	5	5	5	5	5	5	15	14	2.03	9 400	14.9	2.59	5 609	6.3	26.9
Frio	5	5	5	5	5	5	5	5	5	11	12	66.39	4 100	1.6	3.48	4 041	10.4	18.1
Gaines	5	5	5	5	5	5	5	5	5	22	12	10.63	4 500	8.0	3.23	4 190	5.0	16.9
Galveston	6.4	15.1	16.9	18.5	13.1	9.9	8.9	5.7	3.4	27	3.0	12.02	77 400	11.7	2.72	69 290	10.5	21.3
Garza	5	5	5	5	5	5	5	5	5	41	24	24.33	1 900	-5.3	2.80	1 842	7.7	19.7
Gillespie	5	5	5	5	5	5	5	5	5	14	08	10.04	6 200	19.0	2.44	5 219	10.5	22.3
Glasscock	5	5	5	5	5	5	5	5	5	15	08	29.63	400	-9.3	3.48	367	2.1	15.2
Goliad	5	5	5	5	5	5	5	5	5	08	05	35.61	1 800	-8.5	2.91	1 777	8.2	20.4
Gonzales	5	5	5	5	5	5	5	5	5	08	07	39.80	6 600	10.9	2.79	5 945	9.1	21.7
Gray	9.8	13.3	14.2	15.1	11.7	10.5	10.3	8.7	5.3	38	33	4.41	10 506	3.1	2.53	10 224	9.8	22.7
Grayson	7.4	14.6	14.5	15.1	13.2	9.4	10.3	8.7	6.8	70	21	1.50	36 901	8.4	2.56	33 972	9.3	23.2
Grego	8.5	15.2	16.6	17.3	13.1	9.4	8.8	6.4	4.7	36	39	2.02	41 200	14.7	2.67	35 864	9.0	21.6
Grimes	5	5	5	5	5	5	5	5	5	03	10	9.07	5 800	20.3	2.86	4 857	11.5	23.6
Guadalupe	7.6	15.7	16.0	15.9	14.1	10.1	9.2	6.7	4.6	24	26	21.42	19 000	21.1	2.83	15 730	8.3	18.4
Hale	9.1	17.2	17.0	14.3	11.5	10.0	8.2	7.0	5.0	24	26	33.74	12 400	5	2.91	12 365	8.9	18.9
Hall	5	5	5	5	5	5	5	5	5	13	07	15.05	2 000	-7.2	2.76	2 175	4.9	27.6
Hamilton	5	5	5	5	5	5	5	5	5	18	18	2.13	3 300	-1.7	2.74	3 423	4.8	21.1
Hansford	5	5	5	5	5	5	5	5	5	60	24	11.95	2 400	-6.0	2.71	2 558	4.8	20.9
Hardeman	5	5	5	5	5	5	5	5	5	44	06	6.01	2 400	-2.7	2.62	2 476	6.1	27.0
Hardin	6.7	17.5	14.4	17.2	13.2	9.8	8.1	6.4	4.1	10	09	1.40	14 700	7.2	2.89	13 727	7.4	16.8
Harris	8.8	14.9	17	21.9	14.0	8.9	6.5	3.5	2.2	22	7.5	15.32	1 035 800	19.5	2.67	865 842	10.0	21.3
Harrison	9.1	16.9	14.7	15.3	13.5	9.1	8.8	7.3	5.5	18	10	1.03	19 900	10.5	2.63	18 046	10.7	21.6
Hartley	5	5	5	5	5	5	5	5	5	20	03	4.46	1 300	-6.4	2.73	1 361	3.9	14.6
Haskell	5	5	5	5	5	5	5	5	5	32	16	15.47	2 900	-3.6	2.49	2 881	5.9	24.1
Hays	6.4	13.1	32.0	15.1	10.9	7.0	3.1	1.7	2.8	29	2.0	30.51	16 700	46.4	2.78	12 563	6.9	20.1
Hemphill	5	5	5	5	5	5	5	5	5	49	11	10.24	1 800	-3.6	2.54	1 837	4.5	16.7
Henderson	6.8	13.8	13.4	12.0	11.6	11.2	14.6	10.9	5.6	22	14	1.45	20 000	24.1	2.57	16 661	8.6	20.3
Hidalgo	8.5	21.6	17.8	15.1	11.4	8.0	7.5	5.4	3.2	10	15	81.28	99 800	31.4	3.54	75 816	12.1	13.3
Hill	7.9	13.7	13.0	12.5	11.0	9.4	11.9	11.0	8.8	18	18	7.65	19 500	8.8	2.52	9 683	7.3	24.1
Hockley	11.2	19.2	17.4	16.0	12.7	7.5	6.7	6.2	3.6	31	05	27.03	7 800	4.4	3.11	7 532	5.7	17.5
Hood	7.3	13.6	13.0	16.1	12.2	10.8	12.9	9.4	4.5	34	20	4.66	9 700	43.6	2.60	6 758	5.0	17.2
Hopkins	8.1	14.3	15.2	14.8	12.4	9.8	9.6	8.4	5.4	18	11	3.63	10 900	14.2	2.62	9 544	7.2	22.1
Houston	7.7	13.6	12.7	15.6	11.4	10.9	10.1	10.1	7.8	18	11	3.63	7 500	4.7	2.62	7 204	7.5	24.9
Howard	7.6	15.6	16.3	13.3	12.2	11.2	12.5	6.9	4.5	38	49	21.05	13 200	11.4	2.62	11 995	7.8	21.8
Hudspeth	5	5	5	5	5	5	5	5	5	44	10	58.25	700	3.7	3.31	675	7.6	19.6
Hunt	7.8	14.3	17.2	14.4	13.1	10.7	9.5	7.8	5.0	21	29	2.39	24 600	20.8	2.58	20 331	7.7	23.9
Hutchinson	8.8	15.4	13.1	16.4	11.1	9.3	10.3	8.2	4.3	83	33	4.80	10 200	3.4	2.72	9 837	4.8	20.9
Irion	5	5	5	5	5	5	5	5	5	14	-	18.54	700	36.6	2.82	507	4.5	23.1
Jack	5	5	5	5	5	5	5	5	5	45	18	1.31	2 900	-1	2.61	2 894	4.7	23.7
Jackson	5	5	5	5	5	5	5	5	5	08	04	18.88	4 800	-1.8	2.68	4 886	4.0	20.2
Jasper	8.1	17.3	14.8	13.8	12.4	9.8	9.8	8.3	5.8	10	07	1.24	11 100	4.0	2.67	10 708	8.1	18.8
Jeff Davis	5	5	5	5	5	5	5	5	5	18	08	47.16	800	5.9	2.79	762	5.8	22.2
Jefferson	8.3	14.3	17.4	16.8	11.5	9.6	10.0	7.0	4.7	18	1.06	4.00	91 700	16.2	2.77	80 188	10.6	22.2
Jim Hogg	5	5	5	5	5	5	5	5	5	-	02	80.54	1 600	1.9	3.11	1 564	11.5	14.9
Jim Wells	10.6	19.0	16.3	15.7	11.6	8.5	8.3	6.4	3.6	10	11	67.18	12 300	10.2	3.25	11 165	9.7	16.1
Johnson	8.1	16.9	15.3	16.3	13.2	9.1	7.9	6.0	4.8	29	20	4.10	29 400	29.2	2.73	23 107	8.9	17.8
Jones	5	5	5	5	5	5	5	5	5	24	24	14.66	6 800	6.4	2.62	6 387	6.4	23.7
Karnes	5	5	5	5	5	5	5	5	5	01	12	42.99	4 400	-12.7	3.00	4 832	6.2	23.2
Kaufman	8.2	16.1	13.3	15.9	13.4	10.5	8.5	7.8	5.8	17	22	4.24	16 700	26.9	2.84	13 154	8.5	18.8
Kendall	5	5	5	5	5	5	5	5	5	24	19	12.22	5 000	32.7	2.72	3 801	5.4	18.8
Kenedy	5	5	5	5	5	5	5	5	5	74	-	62.61	400	33.3	3.19	300	3.8	15.8
Kent	5	5	5	5	5	5	5	5	5	-	08	3.77	600	1.9	2.60	431	3.0	20.2
Kerr	6.6	11.9	11.9	12.4	10.5	13.0	13.1	13.6	9.8	22	23	13.47	13 800	23.8	2.42	11 171	7.7	24.1
Kimble	5	5	5	5	5	5	5	5	5	05	02	17.42	1 700	10.9	2.29	1 564	7.0	28.1
King	5	5	5	5	5	5	5	5	5	24	-	9.85	100	-5.6	2.75	154	2.6	18.2
Kinney	5	5	5	5	5	5	5	5	5	53	13	57.36	800	7.9	2.80	771	7.8	23.2
Kleberg	9.7	14.3	23.1	18.4	9.7	8.2	7.1	4.4	3.1	22	1.41	52.19	11 000	7.2	2.93	10 280	6.8	23.2
Knox	5	5	5	5	5	5	5	5	5	22	08	17.70	2 100	4.5	2.52	2 010	6.4	24.1
Lamar	7.1	15.3	16.5	12.0	13.4	9.2	10.1	9.3	7.1	51	22	.90	16 800	6.7	2.63	15 770	8.8	21.8
Lamb	5	5	5	5	5	5	5	5	5	29	10	30.39	5 800	-9.0	2.98	6 448	7.8	23.2
Lampasas	5	5	5	5	5	5	5	5	5	24	10	10.70	5 400	22.8	2.50	4 411	6.4	19.5
La Salle	5	5	5	5	5	5	5	5	5	07	11	73.70	1 900	11.3	3.98	1 726	10.5	16.8
Lavaca	5	5	5	5	5	5	5	5	5	17	18	6.02	8 800	-5.0	2.66	9 180	6.9	23.2
Lee	5	5	5	5	5	5	5	5	5	24	18	6.02	4 700	17.4	2.77	3 868	6.9	23.2

[1]Hispanic persons may be of any race. [2]No spouse present. [3]Householder living alone.

Reference 24

RECORD OF COMMUNICATION	(Record of Item Checked Below) ✓ Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Kathy Dean Agricultural Extension Service (713) 855-8716	From: Jairo Guevara FIT Chemical Engineer	Date: 9-20-90 Time: 9:00 a.m.

SUBJECT: Irrigation and Water Intakes From Spring Creek

SUMMARY OF COMMUNICATION

Ms. Dean stated that:

1. There are no drinking water intakes from Spring Creek between Spring, Texas and Lake Houston (23 miles).
2. No irrigation is used from Spring Creek in the traject mentioned above.
3. Irrigation from ground water is used within a 4 mile radius of the Bull Oil and Chemical Transporters site.

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

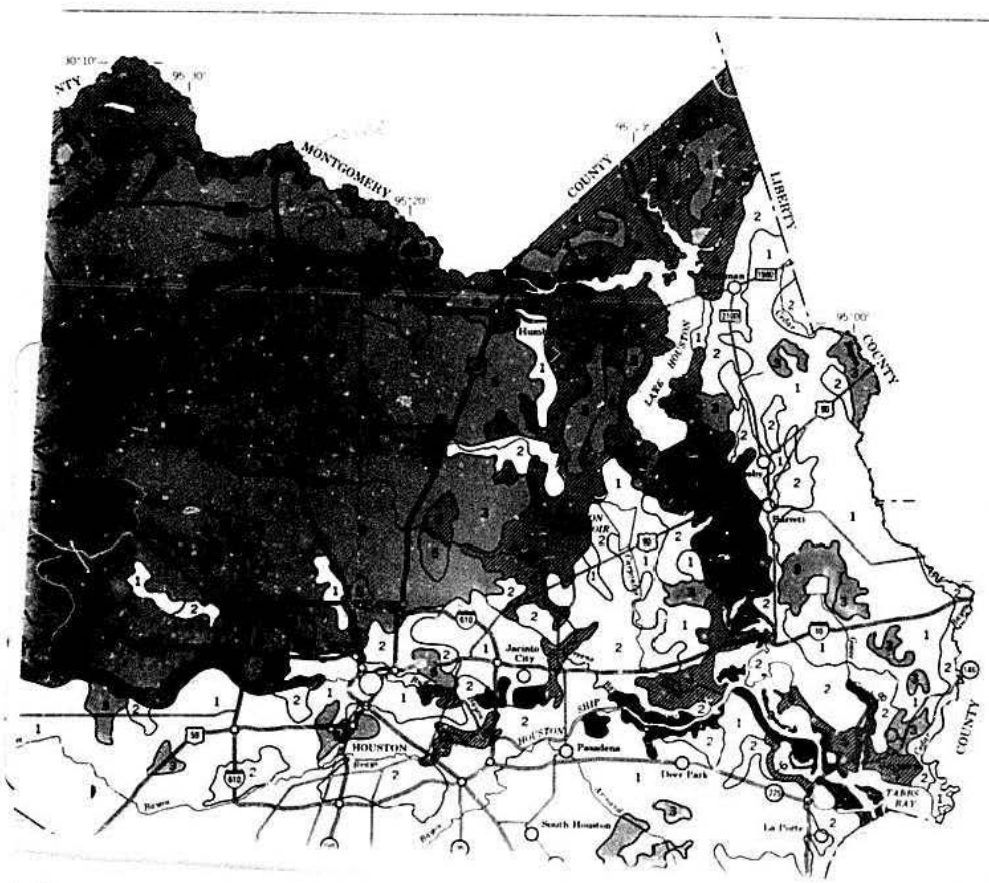
Reference 25

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call __Discussion __Field Trip __Conference __Other(Specify)	
TO: Dana Barbie Section Chief, Ground Water and Subsidence Section U.S. Geological Survey, Houston, Texas (713) 750-1670	From: Raymond Wayne, FIT Hydrologist Raymond Wayne	Date: 4-20-89 Time: 8:55 am
SUBJECT: AID Warehouse - PA (TXD987966066)		
SUMMARY OF COMMUNICATION		
The Chicot aquifer extends from the water table depth (175 to 200 feet		
below land surface) to approximately 600 to 700 feet below sea level near		
the site. The Evangeline aquifer extends from the base of the Chicot		
to between 2,000 to 2,500 feet below sea level.		
The transmissivity of the Chicot and Evangeline are both 6,000 to 9,000		
feet squared per day.		
The site is not in a recharge area of the Chicot. The Beaumont clay		
extends from land surface to between 15 and 20 feet below land surface.		
More than half the unsaturated zone is clay.		
The Chicot is comprised of interfingered sand and clay and is		
hydrologically connected to the Evangeline aquifer. No hydrologic barrier		
between aquifers, difference in hydraulic conductivity and water chemistry.		
No discontinuities within 4 miles of the site. There are salt domes, but		
the resulting faults have little vertical movement.		
CONCLUSIONS, ACTION TAKEN OR REQUIRED		
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

SOIL SURVEY OF
Harris County, Texas

United States Department of Agriculture
Soil Conservation Service
In cooperation with the
Texas Agricultural Experiment Station and the
Harris County Flood Control District

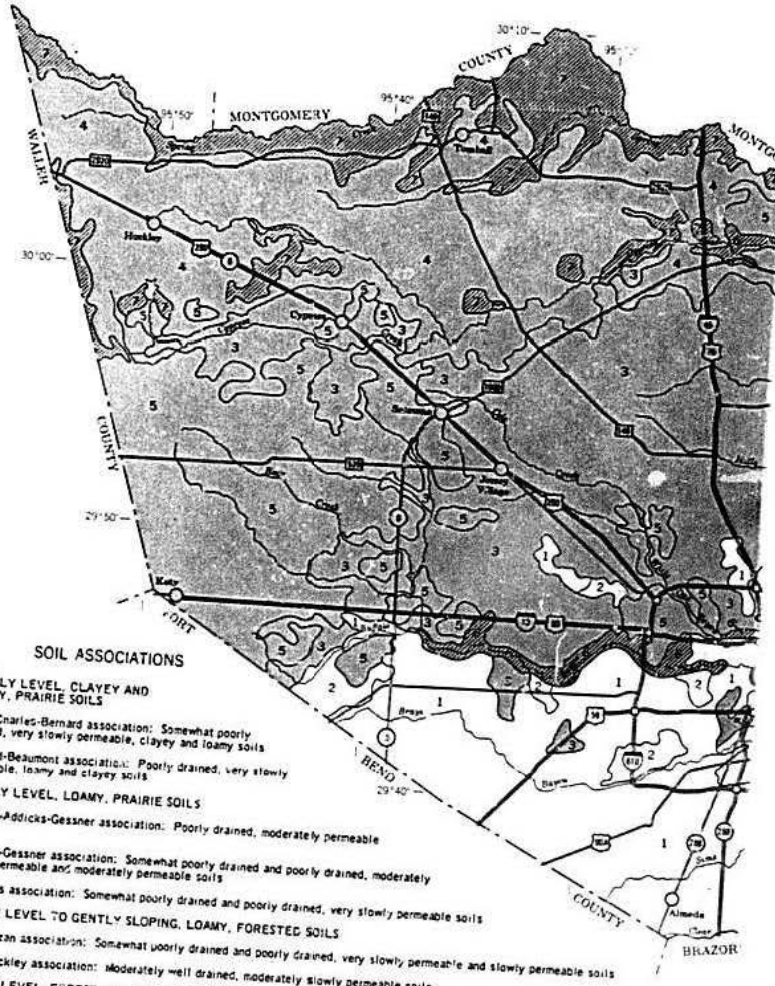


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEXAS AGRICULTURAL EXPERIMENT STATION
AND
HARRIS COUNTY FLOOD CONTROL DISTRICT

N

GENERAL SOIL MAP
HARRIS COUNTY, TEXAS



SOIL ASSOCIATIONS

NEARLY LEVEL, CLAYEY AND LOAMY, PRAIRIE SOILS

1. Lake Charles-Bernard association: Somewhat poorly drained, very slowly permeable, clayey and loamy soils
2. Midland-Beaumont association: Poorly drained, very slowly permeable, loamy and clayey soils

NEARLY LEVEL, LOAMY, PRAIRIE SOILS

3. Clodine-Addicks-Gessner association: Poorly drained, moderately permeable soils
4. Wockley-Gessner association: Somewhat poorly drained and poorly drained, moderately slowly permeable and moderately permeable soils
5. Katy-Aris association: Somewhat poorly drained and poorly drained, very slowly permeable soils

NEARLY LEVEL TO GENTLY SLOPING, LOAMY, FORESTED SOILS

6. Aldine-Ozan association: Somewhat poorly drained and poorly drained, very slowly permeable and slowly permeable soils
7. Segno-Hockley association: Moderately well drained, moderately slowly permeable soils

NEARLY LEVEL, FORESTED, BOTTOM LAND SOILS

8. Nahatche-Voss-Kaufo association: Moderately well drained to poorly drained, rapidly permeable to very slowly permeable, loamy, sandy, and clayey soils

Compiled 1975

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HARRIS COUNTY

SOIL LEGEND

The first letter of the symbol, always a capital, is the initial letter of the soil name. The second letter is a small letter. The third letter, a capital A or B, indicates slope. Symbols without slope letters indicate nearly level soils.

SYMBOL	NAME
Ad	Addicks loam
As	Addicks–Urban land complex
Am	Aldine very fine sandy loam
Al	Aldine–Urban land complex
Ag	Aris fine sandy loam
Ar	Aris–Gessner complex
As	Aris–Urban land complex
AtB	Attasco fine sandy loam, 1 to 4 percent slopes
Ca	Beaumont clay
Bc	Beaumont–Urban land complex
Bd	Bernard clay loam
Be	Bernard–Edna complex
Bg	Bernard–Urban land complex
Bh	Brissette very fine sand, loam
Bs	Bs,y loamy fine sand
Cd	Clodine loam
Cs	Clodine–Urban land complex
Ed	Edna fine sandy loam
Ge	Gessner loam
Gs	Gessner complex
Gr	Gessner–Urban land complex
Ha	Harris clay
Hl	Hatch loam
HoA	Hockley fine sandy loam, 0 to 1 percent slopes
HoB	Hockley fine sandy loam, 1 to 4 percent slopes
Is	Ijam soils
Ka	Kaman clay
Kf	Kelly fine sandy loam
Ke	Keeney loamy fine sand
Ku	Keeney–Urban land complex
LcA	Lake Charles clay, 0 to 1 percent slopes
LcB	Lake Charles clay, 1 to 3 percent slopes
Lu	Lake Charles–Urban land complex
Md	Midland silty clay loam
Mu	Midland–Urban land complex
Ns	Nahatche loam
Oa	Ozan loam
Os	Ozan–Urban land complex
SoA	Segno fine sandy loam, 0 to 1 percent slopes
SoB	Segno fine sandy loam, 1 to 3 percent slopes
Ur	Urban land
VoA	Vamont clay, 0 to 1 percent slopes
VoB	Vamont clay, 1 to 4 percent slopes
Vu	Vamont–Urban land complex
Vs	Vasa sand
Vs	Vasa soils
Wa	Wockley fine sandy loam
Wy	Wockley–Urban land complex

WORKS

Highways and roads
- Divided .....
- Good motor .....
- Poor motor .....
- Trail .....

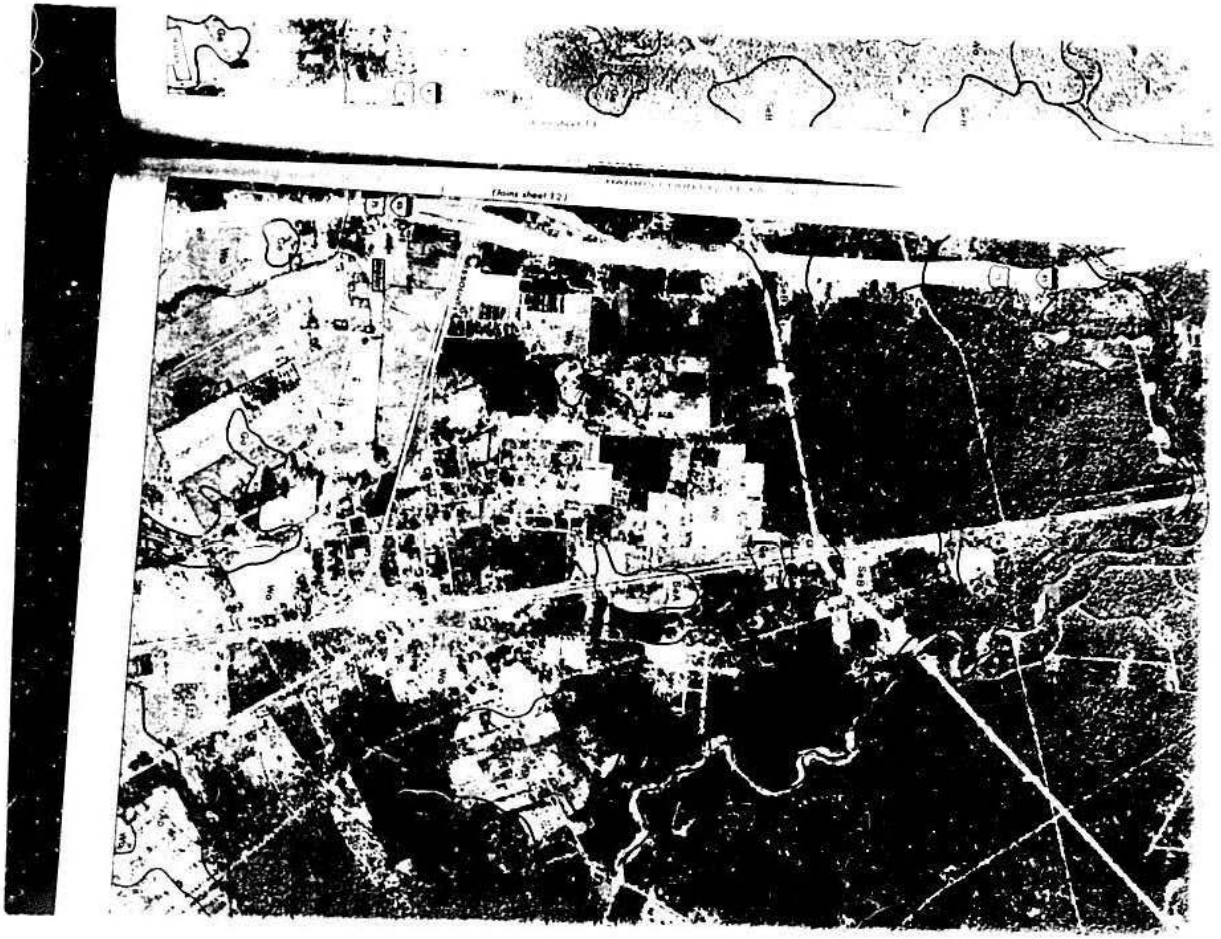
Highway markers
- National Interstate
- U. S. .....
- State, farm or ranch

Railroads
- Single track .....
- Multiple track .....
- Abandoned .....

Bridges and crossings
- Road .....
- Trail .....
- Railroad .....
- Ferry .....
- Ford .....
- Grade .....
- R. R. over .....
- R. R. under .....

Buildings .....
- School .....
- Church .....

Mine and quarry .....
- Gravel pit .....
- Power line .....
- Pipeline .....
- Cemetery .....
- Dams .....
- Levee .....
- Tanks .....
- Well, oil or gas .....
- Forest fire or lookout stat
- Windmill .....
- Located object .....



REFERENCE 27

Herschfield, D.M., 1961, Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.

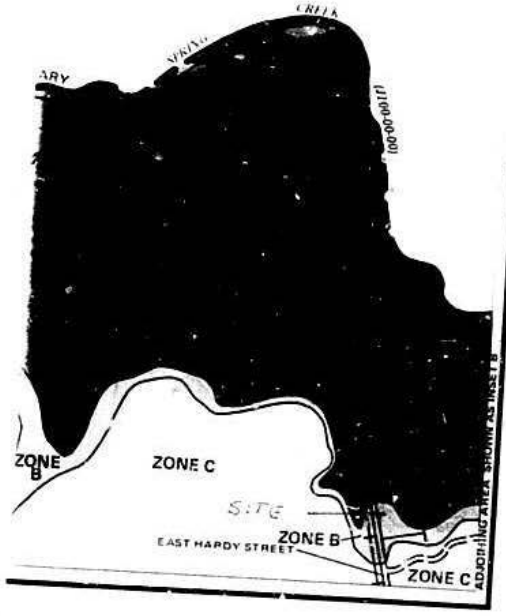
...flood insurance rate zones and map amendment

REFERENCE 28

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE

1000 0 1000 FEET



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

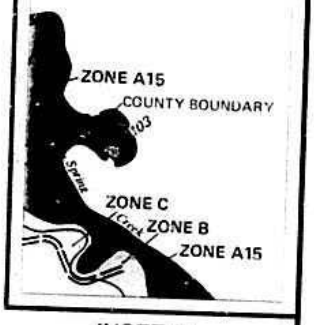
HARRIS COUNTY, TEXAS
UNINCORPORATED AREAS

PANEL 55 OF 550
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
480287 0055 E

MAP REVISED:
FEBRUARY 4, 1988

Federal Emergency Management Agency



INSET B

KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	ZONE B
Zone Designations*	
100-Year Flood Boundary	
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7x
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined but possible flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside special flood hazard areas. The coastal flooding elevations shown may differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

For [illegible] map panels, see separately printed Index To Map

REFERENCE 29

TEXAS SURFACE WATER QUALITY STANDARDS

Texas Department of Water Resources
April, 1981
LP-71

TEXAS SURFACE WATER QUALITY STANDARDS
FRESH AND TIDAL WATERS

SAN JACINTO RIVER BASIN		WATER USES DEEMED DESIRABLE				CRITERIA						
SEGMENT NUMBER	SEGMENT DESCRIPTION	CONTACT RECREATION	NONCONTACT RECREATION	PROPAGATION OF FISH & WILDLIFE	DOMESTIC RAW WATER SUPPLY	CHLORIDE (mg/l) avg. not to exceed	SULFATE (mg/l) avg. not to exceed	TOTAL DISSOLVED SOLIDS (mg/l) avg. not to exceed	DISSOLVED OXYGEN (mg/l) not less than	pH RANGE	COLIFORM: FECAL/ (.00ml) - log. avg. not more than (see Gen. Statement)	TEMPERATURE °F (see Gen. Statement)
1008	Spring Creek		X	X	X	80	40	300	5.0	6.5-9.0	2,000	90
1009	Cypress Creek		X	X	X	80	40	300	5.0	6.5-9.0	2,000	90
1010	Caney Creek	X	X	X	X	50	40	300	5.0	6.0-8.5	200	90
1011	Peach Creek	X	X	X	X	50	40	200	5.0	6.0-8.5	200	90
1012	Lake Conroe	X	X	X	X	50	40	200	5.0	6.5-9.0	200	90

Reference 3C

RECORD OF COMMUNICATION	(Record of Item Checked Below) ✓ Phone Call __Discussion __Field Trip __Conference __Other(Specify)	
To: Dr. Steve Spencer Texas Fish and Wildlife Seabrook, Texas Office (713) 474-2811	From: Jairo Guevara FIT Chemical Engineer	Date: 9-24-90 Time: 9:00 a.m.

SUBJECT: Critical Habitats and Wetlands Near Bull Oil and Chemical Transporters, Inc., Spring, Texas

SUMMARY OF COMMUNICATION

Dr. Spencer stated:

1. There are no significant wetlands (more than 5 acres) at Spring Creek downstream from Spring, Texas to Lake Houston.
2. There are no endangered species within a four mile radius of the site (Bull Oil and Chemical Transporters, Inc). Only two plants, Houston Macharanthan and Texas Windmill Grass could be located in random prairie areas near the site (within a four mile radius). A visit to the area by qualified biologists would be necessary to determine existence of these two plants in the site area.
3. There is possibility of small isolated areas (potholes) within the four mile radius from the site. These wetlands would be less than five acres.

JGuevara

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.